

SPECIAL: Wall Street TECH Woes

MARCH 1998

PEOPLE • TECHNOLOGY • CAPITAL

UPSIDE

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**ANDREESSEN:
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Dead Body!**

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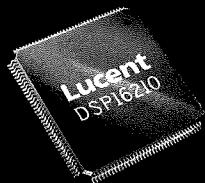


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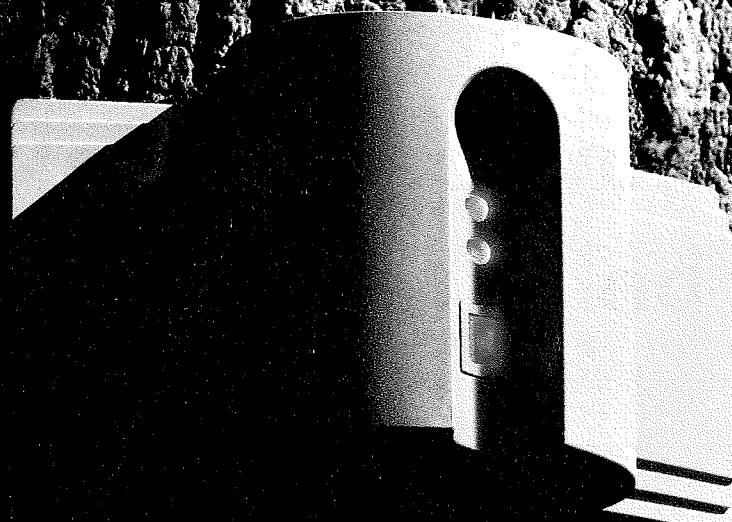
BORN.

Announcing the birth of DSP16210, the most significant Digital Signal Processor to hit the communications market since we invented the first DSP.



TO BE WILD.



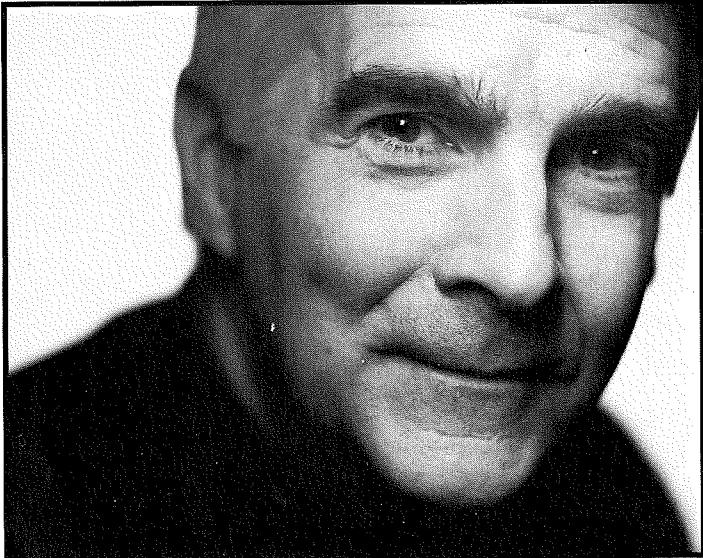


Conceived by Bell Labs specifically for next-generation communications applications, DSP16210's more efficient processing lets it effortlessly handle a variety of functions in any digital wireless standard, using up to five times less power and memory than the most advanced DSP on the market today.

Proven software tools and high-performance processing enable DSP16210 to radically reduce development time and system costs, making it the perfect DSP for rack modems and smaller remote base stations that can be deployed anywhere you can imagine with a savings of up to 50% in electronics costs. To learn more about how the DSP that was designed from the start to be the soul of communications can help you create products beyond your wildest dreams, call 1-800-372-2447 (Ext. 955). Or visit www.lucent.com/micro



If you're constantly changing, how can people be sure it's still you?



bob herbold
COO Microsoft Corporation

branding at warp speed

A conversation with Bob Herbold of Microsoft Corporation, #1 in a series on unique brand challenges.

Warning: speeding can be dangerous to your brand. In the information technology industry, new products are developed in an incredibly short time and old ones change dramatically in front of your very eyes. It's a tremendously exciting and creative environment, but it makes it very hard to maintain the discipline required to create a strong brand image. It's like trying to steer a tornado. I remember not long after I came here, suddenly realizing, "My gosh, we don't have a clear statement of what Microsoft is."

No one likes to fly blind. To build a relationship you must give someone a clear sense of who you are. That's what a brand does. It gives you character and a personality. It lets people know what to expect, and puts them at ease. That's particularly important for us, because so many people still experience anxiety when they confront technology.

Handicapping and discipline.

Choosing the right character for a brand lies somewhere between art and science. You have to study the industry and try to project the future, then carefully select attributes that are likely to stay relevant and attractive. For Microsoft, we boiled it down to one sentence — *Microsoft leads the way in providing access to a new world of thinking and communicating.* That is a sacred statement, and we want people around the world to understand that's what Microsoft is working to stand for. It won't happen, however, unless we can consistently deliver that message.

Once you send it out into the world, is it still yours? Lately, there's been a lot of debate about who really owns a brand. Is it the company or the consumer? I think consumers own the products, and if you listen carefully, they can help you shape them very, very well. But the brand belongs to you. And if you're going to be successful over time, you can never abdicate that ownership. That might not sound politically correct, but it's true.

Microsoft and The Journal.

What's the link? I think of The Journal as a trusted partner that makes me a better business person. By providing access to new ways of thinking and communicating, Microsoft makes a similar promise, so the two brands are extremely supportive of each other. On top of that we share an audience. Microsoft offers information technology that can transform the way a company is run, and Journal readers are often the very people who can put those changes into motion. So it's very important for us to get our products and ideas in front of them.

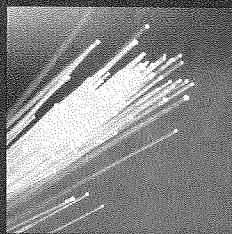
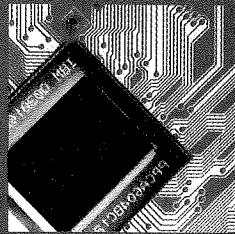
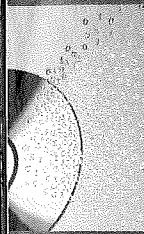
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\$150,000,000
6.25% Convertible
Subordinated Notes
due 2002

December 1997

Diamond Lane Communications

\$31,189,942
Series D Convertible
Preferred Stock

December 1997



\$54,000,000
Initial Public Offering
May 1997

\$75,000,000
Senior Secured Credit Facility
December 1997

JD Edwards

\$417,910,000
Initial Public Offering

September 1997

CYPRESS SEMICONDUCTOR

\$175,000,000
Convertible Subordinated
Notes due 2002

September 1997

COM 21

\$23,099,588
Series G Convertible
Preferred Stock

September 1997

WindRiver SYSTEMS

\$102,465,000
Common Stock Offering
July 1996
\$140,000,000
5% Convertible Subordinated
Notes due 2002
July 1997

BETA systems

DM112,700,000
Initial Public Offering

June 1997

SAMSUNG ELECTRONICS

\$300,000,000
Zero Per Cent Convertible
Bonds due 2007

June 1997

MICRON ELECTRONICS

\$263,925,000
Common Stock Offering

February 1997

VERIO

\$60,000,000
Series B Convertible
Preferred Stock

December 1996

Reynolds & Reynolds

\$100,000,000
7% Senior Notes Due 2006

December 1996

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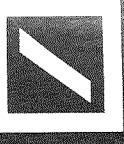
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Landscape financing

 <p>\$139,500,000 Common Stock Offering</p> <p>December 1997</p>	 <p>\$71,846,250 Common Stock Offering</p> <p>October 1997</p>	 <p>\$162,725,000 Common Stock Offering</p> <p>October 1997</p>
 <p>\$310,000,000 5% Convertible Subordinated Notes due 2002</p> <p>August 1997</p>	 <p>\$59,871,000 Initial Public Offering August 1996</p> <p>\$256,162,500 Common Stock Offering August 1997</p>	 <p>\$69,000,000 4.75% Convertible Subordinated Notes due 2002</p> <p>August 1997</p>
 <p>\$34,812,000 Initial Public Offering</p> <p>June 1997</p>	 <p>\$150,000,000 3.25% Step-up Convertible Subordinated Notes due 2002</p> <p>May 1997</p>	 <p>\$38,102,000 5% Discount Convertible Bonds due 2002/2003/2004 and Common Shares</p> <p>February 1997</p>
 <p>\$200,000,000 4.5% Convertible Subordinated Notes Due 2001</p> <p>December 1996</p>	 <p>\$42,607,500 Initial Public Offering</p> <p>December 1996</p>	 <p>\$346,150,000 Common Stock Offering</p> <p>November 1996</p>
 <p>\$32,000,000 Initial Public Offering</p> <p>July 1996</p>		

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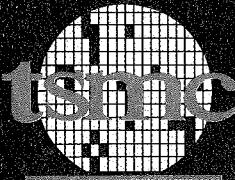
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TSMC-USA, 1740 Technology Drive, Suite 660, San Jose, CA 95110 • Ph: 408-437-9762, Fax: 408-441-7713



Knowledge,

 **MATRIXX MARKETING INC.**
a Cincinnati Bell company

has agreed to acquire

American Transtech Inc.
a wholly-owned subsidiary of



\$625,000,000
Pending

 **SOFTWARE ARTISTRY**

has agreed to be acquired by

Tivoli
a subsidiary of

International Business Machines Corporation

\$202,000,000
Pending

 **AXENT**

has agreed to merge with



\$250,000,000
Pending

 **UNIDATA**

DATA MANAGEMENT THAT WORKS.

has agreed to merge with



\$70,000,000
Pending

 **LBMS**

has agreed to be acquired by



\$82,000,000
Pending

 **DSC[®]**
COMMUNICATIONS

has acquired



\$167,000,000
December 1997

 **RAD NET**

has been acquired by

SIEMENS
&
 **NEWBRIDGE**

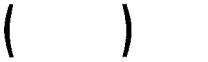
\$75,000,000
December 1997

 **NATIONAL HEALTH ENHANCEMENT SYSTEMS, INC.**

has been acquired by

 **HBO & Company**

\$99,000,000
December 1997

 **PETERCHADWICK**

has been acquired by

 **Cambridge Technology Partners**

\$127,000,000
November 1997



BROADVIEW ASSOCIATES

not just numbers.



AT&T

has divested its
health care division to



HBO&Company

Confidential
October 1997



**NETCOM
SYSTEMS**

has divested
a majority interest
to an investor group
led by

SUMMIT PARTNERS

Confidential
August 1997

DYNASOFT

has been acquired by



Security Dynamics.

\$115,000,000
July 1997

E-TEK

has completed
a recapitalization with

SUMMIT PARTNERS

Confidential
July 1997

LINKAGE™

has been acquired by

Microsoft®

Confidential
June 1997

**TEXAS
INSTRUMENTS**

has sold its Software Business
to

**STERLING
SOFTWARE**

\$165,000,000
June 1997

**intactix
INTERNATIONAL**

has been acquired by

PRiCER

\$87,000,000
June 1997

EST
enterprise systems™

has been acquired by

HBO&Company

\$286,000,000
June 1997

Mobile Computing
Division
of

**TEXAS
INSTRUMENTS**

has been acquired by

Acer

Confidential
March 1997

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I chose a part.

I chose a partner.

In today's rapidly changing technology climate, choosing a strategic partner means more than simply buying a part, because it's a safe bet that what solves your problem today probably won't solve your problem tomorrow.

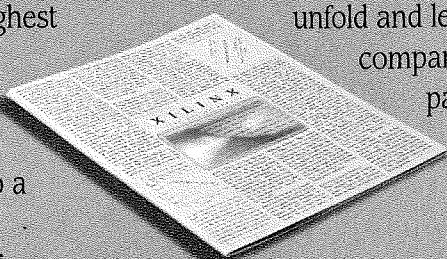
Our solution? It's simple. Offer each and every product necessary for our customers to migrate from low complexity PLD devices to the industry's highest density, highest performance FPGAs. Transparently. All on one common fully-automated software platform. You learn it once, you use it forever. And, when the need arises, flip to a Xilinx Hardwire™ ASIC. Instantly.

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COVER STORY: INTERVIEW

Marc Andreessen

Netscape's co-founder and wunderkind talks about his company's financial woes and Microsoft's Department of Justice fight.

By Richard L. Brandt

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Wall Street

'98 is a Bear

The '97 stock ride was thrilling and the money was unprecedented—then there's '98...

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Tech IPOs Wither

Last year was lousy for tech IPOs. Stormy weather ahead in '98.

By Jim Evans

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Asian Crisis:

What caused the tiger's troubles and why is it killing tech stocks?

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Keep Foreigners Out!

The controversy over using temporary foreign workers to fill the skills gap.

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VENTURE CAPITAL

Diary of a Startup

Whistle Communications knew there was gold in them thar Sand Hills, but how to dig it out?

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INTERVIEW

Larry Keeley

The Doblin Group president studies corporate tea leaves to divine the path to sure success.

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Search Advances

New developments in search technology aim to tame information overload. By Jeff Ubois

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OUR COVER

While photographer, Phillip Saltonstall worried that Mr. Andreessen wouldn't pose with the gloves, Netscape's co-founder was ready to spar. At one point, Marc was instructed to stop moving... he was having too much fun swinging.

departments

Inside Upside

Richard Brandt asks if it's comeback or curtains for Netscape.

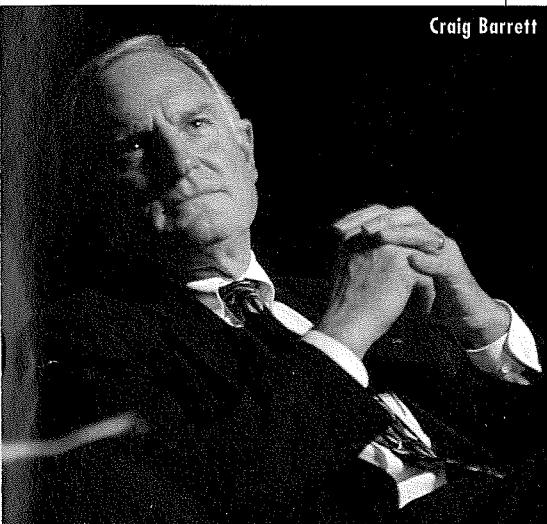
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Craig Barrett



Gambits ▲

Craig Barrett gives Bill Gates a shoulder to cry on; Larry Ellison's blows get lower; Gates polishes his halo; Rupert Murdoch slobbers over Asia.

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UPSIDE debuts Robert Buderi's profiles of the biggest, baddest IQs driving tech innovation with a look at Lee Davenport, former head of R&D at GTE.

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Beware marketing's equivalent of mystery meat—spoiled companies spiced up and rehashed with zesty marketing ploys.

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David Kline joins online trading in holy matrimony with fantasy stock market fanatics for a perfect Net-content coupling.

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Giving the Net's nonprofit founders a little respect—not just for the past, but in guiding the future.

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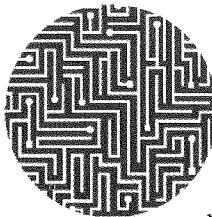
Nothing like an in-flight drunken brawl with your pilot: S.B. Canyon tells of the high-flying hijinks of pickled passengers.

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Soapbox

Hercules, Odysseus, Aeneas, Bill Gates: he's just the latest in a long tradition of heroes who use questionable means to achieve glorious ends.

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ON LOCATION: Japan

You'd think the Japanese would be sprinting to the Web, but they're hamstrung by high telecom rates, cultural constraints and sticky Internet policies.

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Pulpware

Cyberwars gives a French perspective on Internet espionage; *Commercializing New Technologies* gets you from mind to market; *Close to the Machine* gets under the skin of the frustrated computer programmer; *Technology Integration* puts R&D efforts under the microscope; *The Death of Distance* sends the business world spinning in the time/space continuum. Get the play-by-play on tech innovation in *The Technology Leaders*.



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Software M&As broaden companies' enterprise horizons.

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Net stocks were still diving in December.

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Opportunities in a downturn: Brett Hodess of NationsBanc Montgomery Securities offers his picks in the semiconductor equipment arena.

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1st Corporate headquarters

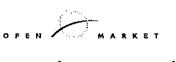
More businesses that start behind these doors eventually knock on ours.

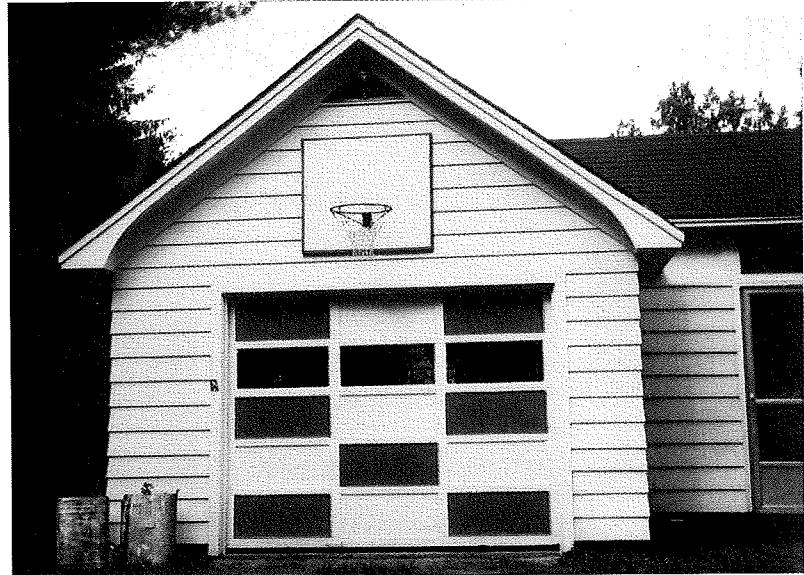
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<p>\$43,125,000</p> <p> RealNetworks</p> <p>RealNetworks</p> <p>Initial Public Offering</p> <p>November 1997</p>	<p>\$594,720,000</p> <p> Taiwan Semiconductor Manufacturing Company</p> <p>American Depository Shares</p> <p>October 1997</p>	<p>\$55,200,000</p> <p> GREAT PLAINS' SOFTWARE</p> <p>Great Plains Software Incorporated</p> <p>Initial Public Offering</p> <p>June 1997</p>
<p>\$51,750,000</p> <p> GENESYS</p> <p>Genesys Telecommunications Laboratories, Inc.</p> <p>Initial Public Offering</p> <p>June 1997</p>	<p>\$88,320,000</p> <p> LHS</p> <p>LHS Group Inc.</p> <p>Initial Public Offering</p> <p>May 1997</p>	<p>\$32,235,798</p> <p> BEA</p> <p>BEA Systems, Inc.</p> <p>Initial Public Offering</p> <p>April 1997</p>
<p>\$132,250,000</p> <p> CIENA</p> <p>CIENA Corporation</p> <p>Initial Public Offering</p> <p>February 1997</p>	<p>\$36,800,000</p> <p> FORRESTER</p> <p>Forrester Research, Inc.</p> <p>Initial Public Offering</p> <p>November 1996</p>	<p>\$96,900,000</p> <p> D. SOLOMON'S</p> <p>Dr. Solomon's Group PLC</p> <p>Initial Public Offering</p> <p>November 1996</p>
<p>\$67,600,000</p> <p> Check Point Software Technologies Inc.</p> <p>Initial Public Offering</p> <p>June 1996</p>	<p>\$82,800,000</p> <p> OPEN MARKET</p> <p>Open Market Incorporated</p> <p>Initial Public Offering</p> <p>May 1996</p>	<p>\$43,125,000</p> <p> EDIFY</p> <p>Edify Corporation</p> <p>Initial Public Offering</p> <p>May 1996</p>
<p>\$50,600,000</p> <p> i2 Technologies Incorporated</p> <p>Initial Public Offering</p> <p>April 1996</p>	<p>\$38,870,000</p> <p> YAHOO!</p> <p>Yahoo! Inc.</p> <p>Initial Public Offering</p> <p>April 1996</p>	<p>\$35,595,000</p> <p> SAPIENT</p> <p>Sapient Corporation</p> <p>Initial Public Offering</p> <p>April 1996</p>

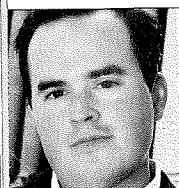


What started as a small,
intimate gathering, could end up being
the public event of the year.

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CONTRIBUTORS



Dave Kansas, editor in chief at TheStreet.com, contributed "1997's Bullfight—Bet on the Bear for '98" (page 82). He considers himself an aspiring sportswriter trapped in a financial writer's body. Prior to joining TheStreet.com he worked for five years at *The Wall Street Journal*, most recently as the newspaper's senior financial markets reporter.

He has provided commentary for the "NBC Sunrise" news program and for Dow Jones television outlets. Kansas received a bachelor's degree in history from Columbia University.

David E. Sanger, who wrote "The Asian Crisis" (page 121), is the leader of the economic unit in the Washington bureau of the *New York Times*, where he has served since October 1994. He covers the confluence of economic forces and foreign policy, as well as domestic economic issues. For six years prior to his post-



ing in Washington, Sanger served as a correspondent and then as bureau chief in the *Times*' Tokyo bureau. Sanger joined the *Times* in 1982, immediately after graduating from Harvard University with a bachelor's degree in government. In 1986, he played a major role in the team that investigated the causes of the space shuttle Challenger disaster. The team won the 1987 Pulitzer Prize for national reporting.

Contributors is compiled by Katie Avoy.

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After 17 years covering business and politics as a television and radio reporter, **Tia**

O'Brien's writing now appears in national and international publications. As a contributing writer for *West*, the Sunday magazine of the *San Jose Mercury News*, she reports on Silicon Valley from a slightly different point of



O'Brien

view. In a recent adventure, she took Dilbert creator Scott Adams undercover into a company as a management consultant and successfully fooled an entire staff of executives. This unique perspective is also captured in this month's article, "Diary of a Startup" (page 88).

Robert Buderi begins his new UPSIDE column, Lab Watch (page 54), in this issue. The assignment—tracking wide-ranging innovations—suits him. He's covered a lot of ground in his career. He served as the photo editor of the *Tombstone Epitaph* newspaper



Buderi

and technology editor for *Business Week*, and has written for publications including *Sports Illustrated*, *Money*, *Science*, *The Economist* and *Newsweek*. In 1986 and 1987 he was a Vannevar Bush Fellow at M.I.T. Most recently, he wrote *The Invention That Changed the World* (Simon and Schuster, 1996), the story of how secret radar research during WWII affected post-war science and technology.

As a consultant who has been digging through large databases and writing about the Internet for more than a decade, **Jeff**

Ubois was the ideal candidate to write our search feature, "It's a Jungle Out There" (page 106). His articles have appeared in *Internet World*, *Digital Media*, *CFO*, *Wired*, *Interactive Week*, the *New York Times* syndicate and other publications. He is fascinated by metaphors, media, community and the future, and is concerned about the similarities between a short bio and an epitaph.



Ubois

Born in Wausau, Wisc., **Kim Wilson Brandt** spent her childhood moving around the country. She obtained a fine arts degree from U.C. Santa Cruz and a degree in illustration

from Art Center College of Design in Pasadena, Calif., then spent nine years as an illustrator in New York. Her clients have included the Cartoon Network, the *New York Times* and others.

In 1994, she fell in love with a talented journalist (now a magazine editor) and moved to San Francisco, where she lives with her husband, Richard, and the world's most incredible baby, Leila Claire. Kim illustrated "It's a Jungle Out There" (page 106) in this month's issue.



Wilson Brandt

READER SERVICES

LETTERS TO THE EDITOR

UPSIDE invites readers to voice their opinions or send feedback on articles. All letters to the editor must be signed and include a name, title, company (if applicable), address and telephone number. UPSIDE reserves the right to edit all submissions.

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BECOMES A
BREAKTHROUGH
IDEA FOR ALL THE
WORLD TO SEE.



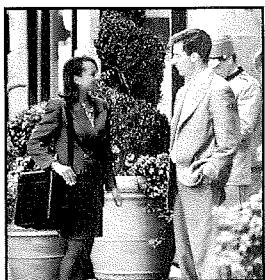
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1997 YEAR END REVIEW

MERGERS & ACQUISITIONS

MIZAR, INC.

Merger with Loughborough Sound Images, Inc.
Pending

BASE10

Divestiture of Government Technology Division
October 1997

ENGAGE TECHNOLOGIES INC.

Acquisition by
Red Brick Systems, Inc.
August 1997

NetFRAME

Exclusive sale to
Micron Electronics, Inc.
July 1997

VERITAS

Merger with
OpenVision Technologies, Inc.
April 1997



Renaissance Solutions, Inc.

Acquisition of
CM Management Systems Ltd.
February 1997

TMA

Technology Modeling Associates
Exclusive sale to Avant! Corp.
Pending

KOCH

DIGITALDISC
Acquisition by
Gilde Investment Management
September 1997

AURUM

SOFTWARE
Exclusive sale to
The Baan Company
August 1997

LERNOUT & HAUSPIE SPEECH PRODUCTS

Acquisition of Centigram's
text-to-speech division
June 1997

3DV

Technology
Exclusive sale to
Network General Corp.
April 1997



Renaissance Solutions, Inc.

Acquisition of
COBA Consulting Ltd.
February 1997

Lightbridge

Acquisition of
Coral Systems, Inc.
November 1997

CD

CONTROL
DATA
Acquisition by Welsh, Carson,
Anderson & Stowe
September 1997

INDUS

The Human Design
Acquisition of
TSW International, Inc.
August 1997

NET

Acquisition by Teleport
Communications Group Inc.
October 1997

CastlerNet

Strategic Partnership with
Dow Jones & Co., Inc.
August 1997

Online interactive

Exclusive sale to
Micro Warehouse, Inc.
July 1997



Printtrak International Inc.

Acquisition of TFP, Inc.
May 1997

LERNOUT & HAUSPIE SPEECH PRODUCTS

Acquisition of GMS GmbH
May 1997

OPEN MARKET

Acquisition of
Folio Corporation
March 1997

OPEN MARKET

Acquisition of Waypoint
Software Corporation
February 1997

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FINANCINGS

BASE 10 Private Placement December 1997	MASTECH Follow-On Offering December 1997	AMCC APPLIED MICRO CIRCUITS CORPORATION Initial Public Offering December 1997	ICOS Initial Public Offering December 1997
Spectra-Physics Initial Public Offering December 1997	Maxwell TECHNOLOGIES Lead Managed Follow-On Offering November 1997	Esat Initial Public Offering November 1997	CROSSKEYS Lead Managed Initial Public Offering December 1997
HYPERCOM Initial Public Offering November 1997	SportsLine Initial Public Offering November 1997	AMERICA ONLINE Convertible Debt Offering November 1997	SecurityDynamics Follow-On Offering October 1997
THE MANGOLESS GROUP Follow-On Offering October 1997	SCM MICROSYSTEMS Lead Managed Initial Public Offering October 1997	Corerity Initial Public Offering October 1997	Pavilion Private Placement September 1997
ELECTRONICS INTERNATIONAL Follow-On Offering September 1997	LERNOUT & HAUSPIE SPEECH PRODUCTS Lead Managed Follow-On Offering September 1997	BRIGGS AUTOMATION Follow-On Offering September 1997	SMART Modular Technologies Follow-On Offering September 1997
APPLIEDGRAPHICS TECHNOLOGIES Lead Managed Follow-On Offering September 1997	Rogue Wave SOFTWARE Follow-On Offering August 1997	logic Lead Managed Follow-On Offering August 1997	APEX PC SOLUTIONS Follow-On Offering August 1997
BRIGHTPOINT, INC. Follow-On Offering August 1997	QAD Initial Public Offering August 1997	SEQUENT Follow-On Offering July 1997	Telegroup Initial Public Offering July 1997
NEON Initial Public Offering June 1997	E A I ENGINEERING ANIMATION, INC. Follow-On Offering June 1997	JetFax THE MULTIFUNCTION COMPANY Initial Public Offering June 1997	ASE Test Limited Follow-On Offering June 1997
teledata Follow-On Offering May 1997	LHS Initial Public Offering May 1997	IIDS INTERNATIONAL TELECOMMUNICATION DATA SYSTEMS Follow-On Offering April 1997	JETFORM Follow-On Offering March 1997
LeCroy Follow-On Offering March 1997	DIGITAL MICROWAVE CORPORATION Follow-On Offering March 1997	MACROVISION Protecting your image Initial Public Offering March 1997	REFACES Follow-On Offering March 1997
iOC Lead Managed Initial Public Offering February 1997	IMS Integrated Measurement Systems, Inc. Follow-On Offering February 1997	Q AFC ADVANCED FIRE COMMUNICATIONS Follow-On Offering February 1997	LEGASTREAM INC. Follow-On Offering January 1997

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011.44171.417.4190Munich
011.49.89.54 90 52.0

Rumors of Netscape's Demise

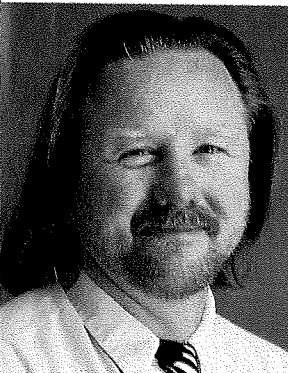
Nobody ever got fired for buying IBM. Remember that one? It actually used to be true. It seems kind of funny now. Just ask people who bought PC Jr.'s, OS/2 desktop systems or other IBM PC mistakes in the 1980s—if you can figure out where they're working now. Truisms come, truisms go, faster than the careers of editorial-writers. But we never seem to smell the corpses until they're really ripe.

Today's truism is that nobody gets fired for buying Microsoft. Like it or not, that one still smells sweet. Will it change? Of course, but it will require a major upheaval, a new revolution to make it happen. IBM was shoved aside by a new industry and new business tactics, both pioneered by Microsoft. Some people (mostly Apple Computer lovers) claim Microsoft never pioneered anything. Of course it did. It invented computer democracy. It split the hardware from the software, all but commodified the former, and took most of the profits and all of the control of PC industry standards.

What, now, will be Microsoft's Vietnam? The only near-term possibility is Netscape. Once again, there is a new (Internet-focused) industry and a new business model (free software, direct distribution, Internet standards).

Unfortunately for Netscape, its job is proving to be much tougher. That's because Microsoft isn't leaving Netscape the same kinds of openings that Big Blue left nearly two decades ago.

We keep hoping Netscape will pull it off. Who doesn't like an underdog, or lively competition in a business market? We look for signs of hope, such as the fact



Editor Richard Brandt
control of PC industry standards.

that Microsoft is actually starting to show the first signs of age (senility in one so young, Bill?) in its battle with the Department of Justice. The arrogance with which Microsoft fights this battle is astounding. It's arguing a technicality when it insists Judge Thomas Penfield Jackson ordered it to remove *all* Internet Explorer code from Windows, rendering it inoperable. Come on, guys, it's obvious that simply removing the IE icon from the desktop and an .exe command or two would suffice. Bill Gates seems to think he can still manage by belittlement: claiming that nobody else understands the PC business as well as he, so everyone else (including the U.S. government), being the imbeciles they are, must follow his lead. It's a dated view, Bill. The rest of the world, believe it or not, is starting to catch on.

Because of this amazingly off-base tactic by Microsoft, the DoJ appears to be on the verge of opening up some opportunities for Netscape by reining in Microsoft a little. The question now is whether Netscape's CEO Jim Barksdale and head technologist and visionary Marc Andreessen can exploit those opportunities and teach Microsoft some new tricks.

It's beginning to look grim. For a year, Netscape has been trying to convince the world that browsers don't matter anymore, that enterprise software—intranet and extranet servers, e-commerce programs and the like—is its future. At first, it seemed like merely a tactic to deflect attention from the fact that it's starting to lose the browser war. Then it actually seemed to be having success with that

strategy ... until the new year, when Netscape suddenly announced it would miss analysts' expectations for its fourth quarter. It attributed the surprise both to price pressure from Microsoft's browser and to weak enterprise sales.

Something really does not smell right with that one. On Oct. 21, 1997, Netscape said it was beating analysts' estimates (albeit slightly), due to its strong

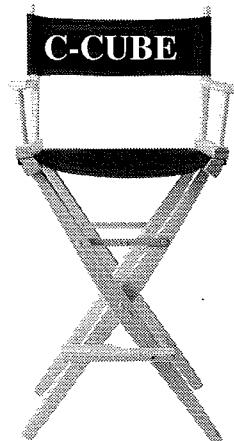
enterprise software sales and improving operating margins. Its stock jumped 12 percent, to \$39.25, the day before those announcements were made. Two and a half months later, it announced it was facing its first operating loss, its first quarterly revenue decline and the first signs of trouble in enterprise sales. Its stock dropped 21 percent in one day, to \$18.56.

The bottom line here is that this time around, Microsoft and even IBM's Lotus unit aren't leaving Netscape any slack. Netscape may have some good enterprise products, but it is not the safe buy. Netscape has to build products that are so superior to Microsoft's that customers can't resist, and create a marketing message that elegantly touts those differences. It has failed to do both.

Finally, Netscape must not ignore or downplay the browser wars. Enterprise software is a client-server package, as near as I can tell, and the browser is the client. Microsoft wouldn't be fighting this war so hard if it wasn't important.

The DoJ could be about to hand Netscape a golden opportunity, just as the company raises doubts as to whether it can be a real contender. Already, we're hearing rumors of its demise. Let's hope they're exaggerated. ■

Back in 1993, C-Cube Microsystems, Inc. was a pioneer in developing digital video compression technology. The goal was to increase channel capacities and improve picture clarity. Even though C-Cube hadn't turned a profit yet, Comerica believed in the vision of their management and realized the market potential of digital technology. We financed them, and history was in the making.



HOW WE HELPED A PLAYER IN VIDEO BECOME AN INTERNATIONAL STAR.

C-Cube introduced their MPEG digital encoder, went public, sales soared all over the world, and a grateful TV industry awarded them an Emmy. Meanwhile, we were busy behind the scenes, helping with foreign exchange transactions, letters of credit and foreign collections. In our books, C-Cube's winning performance deserves a standing ovation.

Comerica

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Selected Transactions



CIRRUS LOGIC
sold its subsidiary Nuera Communications, Inc. to an investor group led by HarbourVest Partners, LLC. December 1997



acquired the assets of the scanner product lines of Logitech, Inc. December 1997



has acquired the assets of Samsung Microwave Semiconductor December 1997



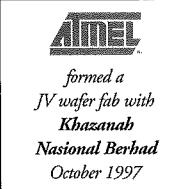
sold its wafer fab to Maxim Integrated Products November 1997



was acquired by Spyglass, Inc. November 1997



was acquired by US Web November 1997



formed a JV wafer fab with Khazanah Nasional Berhad October 1997



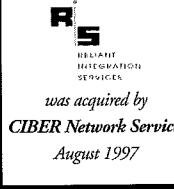
sold its Tactical Subsystems and Microwave Devices Sectors to Stellex Industries, Inc. October 1997



acquired the Star Management Services' Distribution business of Sirius Computer Solutions October 1997



was acquired by Seagate Technology, Inc. August 1997



was acquired by CIBER Network Services August 1997



was acquired by Solomon Software August 1997



Centigram sold its text-to-speech business to Lernout & Hauspie June 1997



acquired Risk Management Technologies June 1997



was acquired by Snap-On Incorporated March 1997



was acquired by Integrated Circuit Systems January 1997



acquired Silicon Design Experts, Inc. November 1996



sold its fab to Orbit Semiconductor, Inc. November 1996



completed a Technology Assistance Agreement with Sharp Corporation September 1996



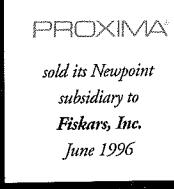
sold its Netwave wireless LAN Business Unit to Netwave Technologies, Inc. September 1996



was acquired by Hewlett-Packard Company September 1996



made equity investments in Anchor Chips, Inc. July 1996



made equity investments in Newpoint subsidiary to Fiskars, Inc. June 1996



was recapitalized through financing led by ACMA, Ltd. April 1996

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In our January issue, Editor Richard Brandt stuck his neck out with some predictions for 1998 and asked you to send us some of yours. Many of you took us up on it. But as we warned you, we're going to keep them and review them at the end of the year.

Predictions

With regard to Richard Brandt's predictions for 1998 ("Looking Forward," January 1998, page 20), I can only say that if his predictions come true, we'll be in for an exciting year. Here are a few observations:

◆ High-tech stocks going up: Why not? I can't foresee a slowdown yet, although one can never be sure.

◆ Microsoft vs. the Department of Justice: The DoJ should never have started this. It's not even funny how much irrelevance its point has. But at the same time, other things have come to light, and people are starting to notice that Microsoft isn't that nice a company. I'm not saying you'll see it go under anytime soon, but this case has cast a shadow on it.

◆ The Java backlash: Hasn't it already begun? Java is slow, and although it's a joy to program, the lack of speed doesn't make it worthwhile—yet. It depends on how fast Sun Microsystems can improve it.

◆ Sun buying Apple Computer: Sounds interesting, and I'd love to see it happen, but I don't know what difference it would make.

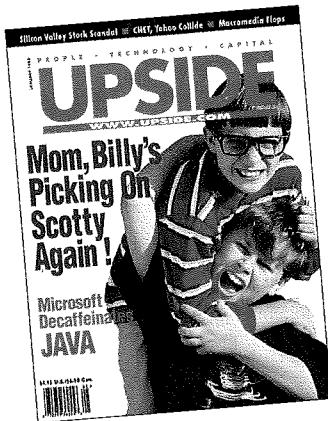
◆ NCs: Have you looked into the Corel Video Network Computer? So far, that's the best I've seen (JavaStation is a joke), and you can run it like a regular PC. Best of all, it uses a Linux-based operating system. However, unless this is a really good product, the NCs will die.

Warren Layton, Student
Ottawa, Ontario

Here's a prediction of another possible scenario. Sun buys Apple, then buys the Snapple

name. Steve Jobs brings in John Sculley to run the soft drink division.

Tony Agnello, CEO
Ariel Corp.
tony.agnello@ariel.com



I agree with Richard Brandt's predictions except:

1. The DoJ will back Microsoft down a notch.
2. Some peripheral-device manufacturer will buy Apple.
3. Elvis will do his big comeback in "Blue Halo."

Dennis Hollenberg, Owner
Hollenberg Associates
d2@isle.net

I'm impressed by Richard Brandt's predictions. I fully agree. But try to explain that to a few Apple diehards. They remind me of my Amiga days. It's strange how people can get so emotionally tied up with "their" technology that they become blind to all logic.

Frank Hoen, President
Netpresenter
frank@netpresenter.com

God creates Bill, Bill creates DOS.

Scott hates DOS, Scott creates Java.

Bill hates Scott, Bill kills Java. Bill and Scott lack humility,

God destroys both.

Perl [Practical Extraction Report Language] inherits the earth.

Ted Okada
ted@fh.org

I disagree with one of Richard Brandt's predictions. I think the DoJ will win against Microsoft for one reason: Justice is not as pure as it once was in this country, and this is going to get political. Look no further than having a cable-TV channel (Court TV) dedicated to the justice system to see that judges are more interested in getting on TV than in doing the right thing. It's not pervasive, and it's not the end of the world, but I have not seen the Clinton administration lose many political battles, and this will be no exception. Microsoft goes down on this one, promises to do better, and nothing will really change.

Jim Baska, Senior Network Design Engineer
Sprint
jim@sprintmail.com

Defending Macromedia

I have included a list of inaccuracies in the article ("Cut! Cut!" January 1998, page 110), whose cumulative effect is to distort the reality of what happened and what is happening at Macromedia.

"In late 1994, Netscape asked us to help bring animation to the Web. But management said, 'No, the Internet's not going anywhere.' ... "Netscape came back in 1995 through a mutual board member, the ubiquitous [John] Doerr."

This is untrue. Doerr set up meetings early on. We increased investment in Shockwave and our Web site as additional resources were needed to complete the project.

"Shockwave was built for the big-bandwidth interactive-TV world, not the bandwidth-starved Web."

Shockwave was built to take advantage of the Director installed base as the leading multimedia authoring tool. Director existed before interactive TV or the Web (as we know it today).

"Colligan and his management team, now swollen by Macromedia's acquisitions, were locked in on interactive TV."

Most of our brain and engineering cycles were going into Web playback of Director and Authorware through Shockwave, and looking for and developing Web and Java authoring tools. In 1993 and 1994, we did licensing deals that required almost no engineering resources for interactive-TV projects.

You wrote that we laid off 75 employees.

We laid off 35 full-time employees and 15 contractors.

"He replaced all senior management [except CTO Norm Meyrowitz]."

Many key members of senior management continue to be senior managers.

"Analysts and former employees alike lament the company's inability to settle on a single plan."

We had a clear plan: the "Wheel" (the notion of having the leading set of integrated digital-media tools). Whether it worked is subject to interpretation, but they all knew what our plan was, and it was duplicated in almost every analyst report.

"Subsequent acquisitions were less auspicious, with Macromedia dropping \$128 million on shopping sprees that included Fauve Software ... OSC Inc. ... iBand Inc. ... and FutureWave Software Inc."

What actually happened:

Fauve:	\$14 million
OSC:	\$2 million
iBand:	\$34 million
Flash:	\$6 million
Total:	\$56 million

continued on page 28

M A N A G E

S E A R C H

R E T R I E V E

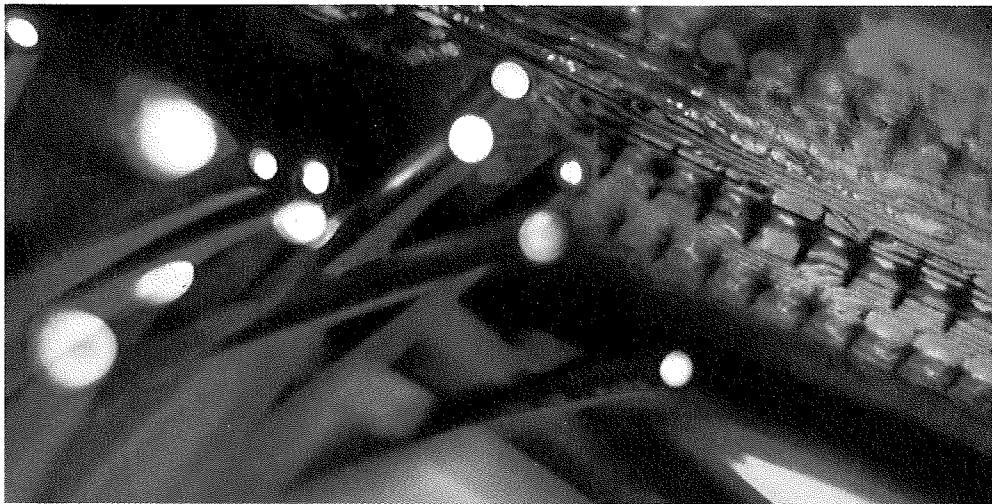
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HORIZONS CORP.
COMMON STOCK
LEAD MANAGER

▲ BT Alex. Brown

SEPTEMBER 1997

\$45,000,000



HAS FORMED A STRATEGIC
PARTNERSHIP WITH AND RECEIVED
INVESTMENT CAPITAL FROM
MICROSOFT
FINANCIAL ADVISOR

▲ BT Alex. Brown

AUGUST 1997

\$89,120,688



ADE CORPORATION
COMMON STOCK
LEAD MANAGER

▲ BT Alex. Brown

AUGUST 1997

\$145,000,000



HMT TECHNOLOGY
CORPORATION
COMMON STOCK
Co-MANAGER

▲ BT Alex. Brown

AUGUST 1997

\$100,000,000



LEVEL ONE
COMMUNICATIONS, INC.
CONVERTIBLE SUBORDINATED NOTES
CO-MANAGER

▲ BT Alex. Brown

AUGUST 1997

\$89,585,000



MANUGISTICS GROUP, INC.
COMMON STOCK
LEAD MANAGER

▲ BT Alex. Brown

AUGUST 1997

\$121,468,750



SPLASH TECHNOLOGY
HOLDINGS, INC.
COMMON STOCK
LEAD MANAGER

▲ BT Alex. Brown

AUGUST 1997

\$281,000,000

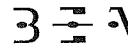


TSW INTERNATIONAL
HAS MERGED WITH
INDUS GROUP
FINANCIAL ADVISOR

▲ BT Alex. Brown

JULY 1997

\$117,300,000



BEA SYSTEMS, INC.

COMMON STOCK

CO-MANAGER

▲ BT Alex. Brown

JULY 1997

\$460,997,504



CIENA CORPORATION

COMMON STOCK

Co-MANAGER

▲ BT Alex. Brown

JULY 1997

\$58,650,000



GALILEO
TECHNOLOGY LTD.

ORDINARY SHARES

LEAD MANAGER

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JULY 1997

\$102,551,250



HARBINGER
CORPORATION

COMMON STOCK

LEAD MANAGER

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JULY 1997

\$50,700,000



INFORMATION MANAGEMENT
ASSOCIATES, INC.

COMMON STOCK

LEAD MANAGER

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JULY 1997

\$112,125,000



INFORMATION MANAGEMENT
RESOURCES, INC.

COMMON STOCK

Co-MANAGER

▲ BT Alex. Brown

JULY 1997

\$80,750,000



RADIANT SYSTEMS, INC.

COMMON STOCK

LEAD MANAGER

▲ BT Alex. Brown

JULY 1997

\$165,000,000



STERLING SOFTWARE, INC.
HAS ACQUIRED
TEXAS INSTRUMENTS
SOFTWARE

FINANCIAL ADVISOR

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JUNE 1997

\$82,225,000



POWERWAVE
TECHNOLOGIES, INC.
COMMON STOCK

LEAD MANAGER

▲ BT Alex. Brown

 **Bankers Trust**
Architects of Value

Continued from page 24

"In early December 1996 ... management told Wall Street that earnings for its third quarter (ending Dec. 31) would be about \$5.6 million. A month later, however, the company reported a loss of \$2.36 million."

We do not give The Street specific guidance (exact numbers). If these are The Street's estimates, they come from analysts, not management.

"It had more than 50 products."

We had about 10 products. "The company has never been able to get its management act together."

Is this a fair statement in light of 16 consecutive quarters of increasing sales and profits before an admittedly tough late '96-'97 period?

"Few software companies have promised so much and delivered so little for so long as this would-be multimedia kingpin."

We ship hundreds of thousands of full products and upgrades per year and have millions of satisfied customers. Did anyone talk to our customers or come to our user conference (more than 6,000 people attended over three days in October 1997)?

Bud Colligan, Chairman
Macromedia Inc.
colligan@macromedia.com

Paul Kedrosky responds:
Most of Colligan's "inaccuracies" are matters of opinion. But he does make some specific points that are worthy of comment.

"The Internet's not going anywhere."

As the context makes abundantly clear, my quote was the consensus opinion of "multiple" former Macromedia employees, as well as various industry analysts.

Shockwave's interactive-TV (ITV) origins:

The facts speak for them-

selves. Shockwave produces bloated, proprietary output that is ill-suited to the Internet. **The Shockwave strategy:**

While he doesn't deny that Shockwave was the offspring of the company's failed ITV projects, he implies that means his company was therefore successful in ITV. That fascinating logic neatly circumvents the issue: The company didn't know what it had in Shockwave until too late, then never created an effective business model for it.

Layoff numbers:

The numbers I used came directly from my conversation with Rob Burgess, current Macromedia president.

Replaced senior employees:

In 18 months, Macromedia turned over all key positions except Meyrowitz's. There were multiple articles in the 1996-97 period about the management churn at Macromedia.

Ability to settle on a plan:

Colligan argues that the "suite" strategy worked. It didn't. That's why Burgess began unwinding it shortly after he arrived in 1996.

Acquisitions:

Colligan omitted Altsys (January 1995: \$56 million) and FutureWave (December 1996: \$11 million).

Street guidance:

He and I both know how the guidance game is played. Management and analysts play a game of "too hot, too cold" until a reasonably tight range of estimates is reached on The Street.

Number of products:

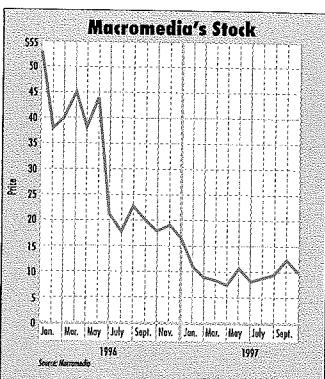
Macromedia had too many products in the time frame in question. The number I used was also specified in contemporary accounts.

Getting its act together:

Since going public in late 1993, Colligan's Macromedia has delivered shareholders a 0 percent return. It is, perhaps,

instructive to see Colligan ignoring how poorly his company's stock has performed and pointing instead to how many people he has attracted to user conferences.

(See chart below.)



I read with interest your article on Macromedia ["Cut! Cut!" January 1998, page 110]. As a multimedia programmer, I've been using Macromedia's tools and have kept an eye on the company for no less than five years.

Even though the article contains accurate information about some of Macromedia's less-than-stellar experiences, it is, as a whole, a work of relentless bashing that has made me lose my faith in UPSIDE as a reputable source of information. To start with, the cover exclaims "Macromedia Flops!" The last time I checked, it was still a multimedia company putting out tools used by a large chunk of the multimedia community.

The author goes out of his way to paint Macromedia as an artsy-fartsy, indecisive, floundering company. Perhaps some of the author's "insight" comes from his ignorance of the multimedia market's evolution. The market has changed as competing technologies vie for market share. To remain strong, companies such as Macromedia need to adapt and change with the market. To buy companies or develop new products (as Macromedia has done) is one way to do this. For any company to be successful

in every new venture would be rare.

Kevin Rehbein, Multimedia Programmer
Interactive Media Inc.
krehbein@interactive-media.com

Silicon Valley Sting

I am writing to make a correction to the UPSIDE article "Silicon Valley Sting?" [January 1998, page 82] by Jonathan Littman.

UPSIDE had me pegged in its "What We Know" sidebar as a director of the Silicon Valley IPO Network [SVIPON], an investment vehicle hatched by Diablo Associates and the subject of the so-called "sting."

I have never held any position with SVIPON, nor have I had any discussions or proposals relating to a position with SVIPON. I was an employee of ElasticMedia, one of the companies Diablo had promised to fund. In February 1997, I signed an agreement to be president and director of ElasticMedia. I resigned all positions on July 2, after many failed attempts to obtain company financial information from Diablo—before there was any hint of an investigation by the feds.

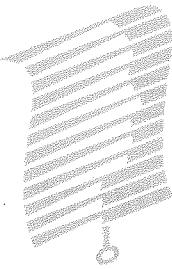
ElasticMedia fell apart in August, its products only 30 days from launch. With the arrests of key Diablo figures on charges stemming from previous ventures, as well as the raid on SVIPON's lead brokerage, there were no supports left for the once-promising company.

If there's a message for Internet entrepreneurs in all this, it's that old-fashioned reference checking and documentation should be taken as seriously as products, timing and profits.

Jim Williams, President
MarketHome
jmw@markethome.com

Jim Williams' name and title were taken from a copy of a prospectus for Silicon Valley IPO Network Inc. that was

continued on page 32



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<p>\$464,000,000 TEXAS INSTRUMENTS has agreed to acquire Amati Communications Pending</p>	<p>\$613,000,000 SIEMENS has announced the sale of its SI Defense Electronics Group to a consortium of Daimler-Benz and British Aerospace Pending</p>	<p>\$157,000,000 PRI Automation as agreed to acquire Equipe Technologies, Inc. Pending</p>	<p>EDS Unigraphics and Intergraph have agreed to combine their CAD/CAM operations Pending</p>	<p>PERKIN ELMER has agreed to acquire Molecular Informatics Inc. Pending</p>	<p>\$65,000,000 INGRAM MICRO has announced a minority investment in Electronic Resources Ltd. December 24, 1997</p>
<p>\$650,000,000 Livingston has been acquired by Lucent Technologies December 15, 1997</p>	<p>\$1,115,000,000 MCAFEE has merged with Network General December 1, 1997</p>	<p>\$179,000,000 NETSCAPE has acquired Kiva Software December 1, 1997</p>	<p>\$883,000,000 MISYS has acquired Medic Computer Systems November 26, 1997</p>	<p>\$474,000,000 Bellcore has been acquired by Science Applications International Corporation (SAIC) November 17, 1997</p>	<p>INGRAM MICRO has acquired Computacion Technica, S.A. November 11, 1997</p>
<p>\$1,519,000,000 SiliconGraphics, Inc. has acquired ParaGraph International September 30, 1997</p>	<p>\$1,519,000,000 amdaHL has been acquired by Fujitsu Limited September 18, 1997</p>	<p>\$2,727,000,000 COMPAQ has merged with Tandem Computers Incorporated August 29, 1997</p>	<p>\$356,000,000 AST RESEARCH INC. has been acquired by Samsung Electronics Co. August 12, 1997</p>	<p>\$78,000,000 INGRAM MICRO has acquired the Reseller Network Division of Intelligent Electronics Inc. July 16, 1997</p>	<p>\$3,000,000,000 TEXAS INSTRUMENTS has sold its Defense Electronics business to Raytheon Company July 11, 1997</p>
<p>\$2,884,000,000 Cascade has merged with Ascend Communications June 30, 1997</p>	<p>\$273,000,000 microcom has been acquired by Compaq Computer June 30, 1997</p>	<p>\$1,180,000,000 HEWLETT PACKARD has merged with VeriFone, Inc. June 25, 1997</p>	<p>\$8,859,000,000 U-Robotics has merged with 3Com June 12, 1997</p>	<p>\$130,000,000 FUJITSU has acquired Nexion a division of Ascom Holding A.G. June 9, 1997</p>	<p>\$440,000,000 EPIC has merged with Synopsys March 3, 1997</p>
<p>\$145,000,000 TELEMATION NETZWERK AG has been acquired by Persetel Holdings Ltd. February 3, 1997</p>	<p>\$210,000,000 Cascade has acquired Sahara, Inc. January 29, 1997</p>	<p>\$285,000,000 APPLIED MATERIALS has acquired Opal, Inc. and Orbot Instruments Ltd. January 8, 1997</p>	<p>\$3,411,000,000 AT&T has spun-off NCR Corporation December 31, 1996</p>	<p>\$3,085,000,000 Rockwell has sold its Aerospace and Defense Business to Boeing Company December 9, 1996</p>	

MORGAN STANLEY DEAN WITTER

Leadership in Technology IPOs

EXCEL \$108,675,000 Common Stock November 4, 1997	MMC \$44,275,000 Common Stock October 28, 1997	JD Edwards \$417,910,000 Common Stock September 23, 1997	@Home Network. \$108,675,000 Common Stock July 10, 1997	Rambus Inc. \$37,950,000 Common Stock May 18, 1997	NEOMAGIC CORPORATION \$41,400,000 Common Stock March 18, 1997
TMP Worldwide \$92,000,000 Common Stock September 17, 1997	MoneyGram \$199,500,000 Common Stock December 11, 1996	SEACHANGE INTERNATIONAL \$34,500,000 Common Stock November 4, 1996	INGRAM MICRO \$414,000,000 Class A Common Stock October 31, 1996	Q AFC \$88,500,000 Common Stock February 12, 1997	CYMER \$87,150,000 Common Stock December 12, 1996
ANS INTERNATIONAL NETWORK SERVICES \$46,000,000 Common Stock September 18, 1996	TELETYPE \$142,600,000 Common Stock October 31, 1996	cnet \$32,000,000 Common Stock July 1, 1996	DASSAULT SYSTEMES \$193,864,349 Common Stock September 23, 1997	XYLAN \$273,700,000 Common Stock May 29, 1996	DOCUMENTUM \$71,846,850 Common Stock October 30, 1997
Initial Public Offering December 12, 1996	Initial Public Offering December 11, 1996	Initial Public Offering July 31, 1996	Initial Public Offering in the form of Shares or ADRs June 27, 1996	Initial Public Offering March 11, 1996	Initial Public Offering February 5, 1998

Leadership in Technology Financings

SanDisk \$84,000,000 Common Stock November 18, 1997	APPLIED MATERIALS \$400,000,000 Senior Notes October 9, 1997	SMART Modular Technologies \$154,137,375 Common Stock September 11, 1997	IPEC \$115,000,000 Convertible Subordinated Notes* September 11, 1997	SiliconGraphics, Inc. \$234,000,000 Senior Convertible Notes September 4, 1997	SPECTRIAN \$90,000,000 Common Stock August 14, 1997
Manugistics \$77,900,000 Common Stock August 13, 1997	CYMER \$172,500,000 Step-Up Convertible Subordinated Notes* August 1, 1997	SEQUENT \$1,000,000,000 Senior Notes & Debentures July 30, 1997	Taiwan Semiconductor \$350,000,000 Convertible Debt July 20, 1997	Data General \$212,750,000 Convertible Subordinated Notes* June 26, 1997	Data General \$212,750,000 Convertible Subordinated Notes* May 15, 1997
EMC² EMC Corporation \$450,000,000 Convertible Notes* March 6, 1997	Seagate \$700,000,000 Senior Notes and Debentures February 27, 1997	ORACLE \$300,000,000 Senior Notes February 19, 1997	SAP \$526,400,000 Common Shares February 6, 1997	CUC INTERNATIONAL \$450,000,000 Convertible Subordinated Notes* February 5, 1997	ASML ASM Lithography \$268,106,250 Ordinary Shares* January 29, 1997
LEXMARK \$248,750,000 Class A Common Stock January 29, 1997	Macronix International Co., Ltd. \$200,000,000 Convertible Bonds January 20, 1997	Integral Capital Partners III, L.P. \$189,000,000 Integral Capital Partners III, L.P. January 1, 1997	Microsoft \$1,000,000,015 Convertible Exchangeable Principal-Protected Preferred Shares December 17, 1996	CADENCE \$210,737,500 Common Stock November 21, 1996	NETSCAPE \$346,150,000 Common Stock November 11, 1996

MORGAN STANLEY DEAN WITTER

Continued from page 28
provided to *UPSIDE* by the author. See www.upside.com for the latest update on the Silicon Valley sting.—Editor

Cover Complaint

Your January 1998 cover sucks. At [a recent high-tech marketing event], it was prominently displayed on a table, and many people who were not familiar with your magazine looked at the cover and threw it back down. It looks like a kids' magazine.

My company ran a large ad in that issue and was disappointed with the cover. It did not convey that you have anything to do with high tech.

The copy on the cover explained it, but the photo did not tell enough of a story. You can't even see the Java logo on the young Scott McNealy's shirt, and the young Bill Gates should have a Microsoft shirt on. A group of us talked about your cover, and we all concluded that it sucked, but there were some good articles inside.

Keep up the quality editorial.
Name Withheld by Request

Pro Profanity

Letter writers in the January edition of *UPSIDE* need to lighten up concerning profanity and porn. I find it refreshing that your interviewees are comfortable enough to use a smattering of profanity to make their points. That's real life. I have always maintained that people use profanity as adjectives and descriptors, not just to shock the listener or reader.

J. Kim McNutt, Owner
McNutt Media
jmcnutt@nmsu.edu

Java Justice

The sidebar ["How Java Got Hot"] on page 97 of the January 1998 issue makes several errors in saying, "Java needs to be interpreted on native operating systems one line at a time."

The most serious error is that "Java needs to be interpreted." There is no such thing as an interpreted language; there are only interpreted or compiled implementations of a particular language. Java is specified in a way that makes interpreted implementations easier to construct.

Finally, Java interpretation does not occur "one line at a time." Line boundaries have almost no significance in the Java language.

L. Peter Deutsch, President
Aladdin Enterprises
ghost@aladdin.com

Women in Tech

I found the comment in "Cyberfemi-Not!" [January 1998, page 46] about women being a novelty in the technology world interesting.

In March 1996, I opened a cybercafé and a year later went into the Internet [service] provider business. Because my background includes a stint in customer service for a legal-publishing company and teaching, I bring to the table a set of skills that are different from my male competitors, many of whom have only worked in the computer world.

Most of my customers are 50 years old or older. Because my business is new and small, I take the time to explain how to e-mail, search for information and set up their systems. There is a huge, untapped market that has been ignored by those folks in the computer world whose people skills could use a lot of work.

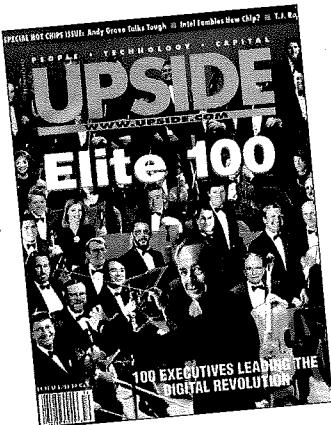
I have always known how to work with the guys, and they have always respected me. I learned long ago to avoid the ones who don't.

Jean Adler, Owner/Operator
Cyber Bean
jean@espressocom.com

Keep Java Pure

Richard Brandt is shortsighted.

The pseudo-religious dogma he associates with Sun Microsystems' Java technology ["Java Crusade," December 1997, page 20] is light years from the truth. Java solves problems that corporations face every day. If the depth of your experience is buying and using whatever crap Microsoft puts out, I can understand why the promise of Java does not compel you.



However, if your business has anything to do with technology, Java is a miracle worker. My company uses many platforms, and Java makes it possible for applications to be written once and run anywhere. This saves us time and money. If Bill Gates is allowed to pollute Java with a bunch of Windows-only features, we all lose.

Michael Koppelman, President
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lolife@bitstream.net

Richard Brandt responds:

The promise of Java does appeal to me. It's the reality that does not. "Write once, run everywhere" is a beautiful idea, but even a virtual machine and just-in-time compilers cannot possibly allow you to write one application that takes advantage of all the best features of every operating system and runs quickly. A Windows-only application will always be faster.

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And yet, Scott McNealy seems to think Java can help steal control of the PC and server markets from Windows and Windows NT. He's fighting wars that have already been lost! McNealy needs to focus Java entirely on smart cards, personal digital assistants and smart appliances—places where Windows does not yet dominate.

As a Sun investor, I can only hope Richard Brandt is not dead-solid-perfect on his prediction that Java will flop. Even though it is not a major influence on earnings, it could be someday. Regardless of Java, Sun's earnings and market will continue to grow, especially in China and Japan. Even though those markets have nearly been killed, they will come back quicker than most investors believe. After all, are we told to invest for current or future profits?

Maybe Bill Gates will offer to buy Sun. Fat chance, but I'd love to be holding Sun shares if he did. Come on, Bill, give somebody else a chance.

Kurt Michael Widenhouse, President
Widenhouse Violin Shop
violinmaker@loch.net

Richard Brandt derides the platform independence that Java brings with the simplistic query, "How many platforms do you have on your desk?"

Why should I care if the application I want to use runs on any platform but my own? Because there are other people in the world, and I may need to leverage some of their knowledge. If there's a platform-neutral Java app involved, we can readily run the same application, so we can collaborate easily.

Also, the platform I work on today may not be the platform I want to work on five years from now. Currently, switching platforms requires repurchasing the applications for the

new platform, which significantly raises the cost of switching. If my applications are platform-neutral Java, all I have to decide is which platform I want to use.

Arlen P. Walker, Senior Programmer
Johnson Controls Battery Group Inc.
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Right On, Realware

I enjoyed David Coursey's article ["Computer Shopper Caveat," January 1998, page 55] and his complimentary reference to Macintosh. He'll get lots of flak, but he knew that before he wrote it.

I also own both platforms, and I agree that you get what you pay for (I will not let friends buy Packard Bell!). I don't understand why some people brag about saving \$500, when it takes 10 hours out of their lives to get everything working. My time is worth more than that. Thanks for a balanced view.

Stephen Fleming, General Partner
Alliance Technology Ventures
fleming@atv.com

It's All Andy

I have been in the semiconductor application, marketing and sales business since the mid-1980s, competing with Intel directly for "design wins" or mind share at distribution sales channels.

It is not the architecture of new processors that keeps Intel on top of the industry, but rather a business strategy that includes the use of acquisitions, the legal system and marketing. That strategy is led and fueled by Andy Grove ["Andy Grove on Intel," December 1997, page 82]. I have my own semiconductor sales representation firm and work with a number of semiconductor manufacturers. Without exception, they all want to emulate Intel. However, the ingredient they are missing is Grove.

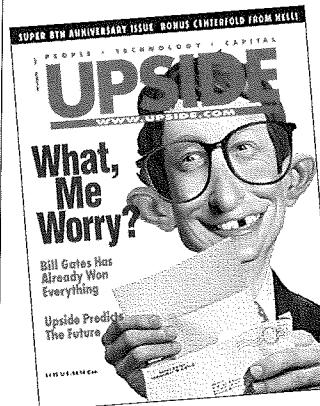
If some of my manufacturers had a fraction of Grove's ability, I would be wealthy. Intel should worry about what happens to the company after Grove departs.

Terry Parker, Owner/Semiconductor
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terrance@alliance-elec.com

Keep Up the Good Work

Just thought I'd tell you that the November issue was great. I especially enjoyed "Give Up" [page 92] by Michael Malone and the article on Manuel Castells ["Bewildered New World," page 108]. People with their heads in the clouds and no common sense can read *Wired*. I would rather read *UPSIDE* any day.

Dan Romanchik, Writer and
Web Site Developer
danr@izzy.net



Corrections:

In the "Macromedia's Arsenal" sidebar (January 1998, page 144), the Fontographer developer was incorrectly identified. It was a product Macromedia acquired with Altsys Corp.

In the January story "Cut! Cut!" (page 110), we erroneously reported Macromedia Inc.'s 1996 earnings as \$27.7 million. In fact, Macromedia earned only \$23 million that year. The \$27.7 million was the company's 1996 operating income, according to its annual report.

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\$300,000,000 MOTOROLA 5.22% Debentures Due 2097 October 1997	\$248,000,000 LEXMARK 12,000,000 Shares Class A Common Stock October 1997	\$297,000,000 AGT APPLIED GRAPHICS TECHNOLOGIES 6,900,000 Common Shares September 1997	\$205,124,961 DIMENSION DATA 53,604,084 Common Shares September 1997	\$99,426,000 BROOKS AUTOMATION 2,669,150 Common Shares September 1997
\$180,000,000 KENT ELECTRONICS 4.50% Convertible Subordinated Notes Due 2004 September 1997	\$121,000,000 Brightpoint, Inc. 4,000,000 Common Shares August 1997	\$4,324,000,000 General Cable CORPORATION 4,350,000 Common Shares August 1997	\$126,000,000 CISCO SYSTEMS has acquired Dagaz Technologies July 1997	\$4,324,000,000 General Instrument Strategic Restructuring Plan July 1997
\$1,000,000,000 IBM 6.45% Notes Due 2007 6.22% Debentures Due 2027 July 1997	\$783,950,000 GALILEO Initial Public Offering July 1997	\$80,000,000 Telinfo SA 1,500,000 Common Shares July 1997	\$108,675,000 @ Home Network Initial Public Offering July 1997	\$150,000,000 VERIO 150,000 Units consisting of 13.50% Senior Notes due 2004 and Warrants to Purchase 2,112,480 Common Shares June 1997
\$56,700,000 CANDESCENT Preferred Stock June 1997	\$130,800,000 HADCO 2,300,000 Common Shares June 1997	\$95,000,000 ASE Test Limited 2,200,000 Common Shares June 1997	\$22,000,000 China Internet Corporation Preferred Stock June 1997	\$1,390,000,000 Amphenol has agreed to merge with an affiliate of Kohlberg Kravis Roberts May 1997

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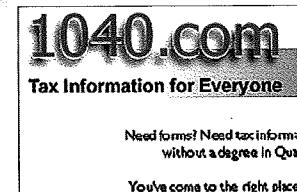
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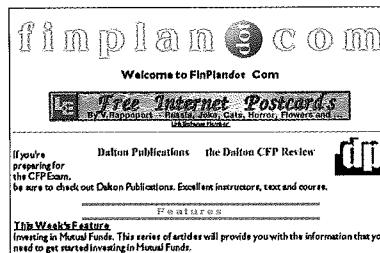
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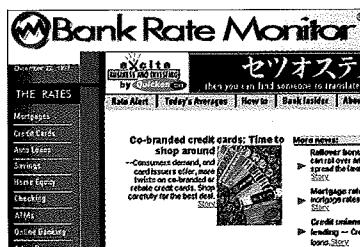
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Bookmarks is compiled by Michael Mattis.

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If I have less than this in my [United Airlines] account, colleagues will think I either spend too much time at home or am overly generous to the family.

COURTESY OF GRAPEVINE



Cyril Brookes
CEO, Grapevine Technologies
Troy, Mich.
www.grapevine.com

Cache This

www.finweb.com

FINWeb aggregates everything you need to know about economics and finance. Not a commercial site, this is a labor of love that organizes many varied resources.

www.audionet.com

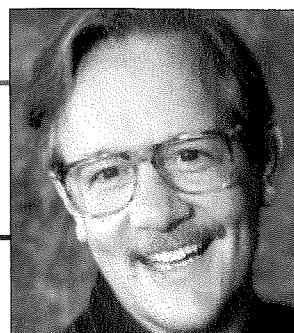
AudioNet is where I listen to news and sports Webcasts that would be geographically impossible to receive using conventional radio. There's even a CD jukebox with complete recordings of the latest music releases.

www.onsale.com

This auction house is an example of location-independent commerce. The bidding is hot and heavy, and there are new auctions every day. Soon I'll get up the courage to actually bid.

<http://my.yahoo.com>

I'd hate to live without it.



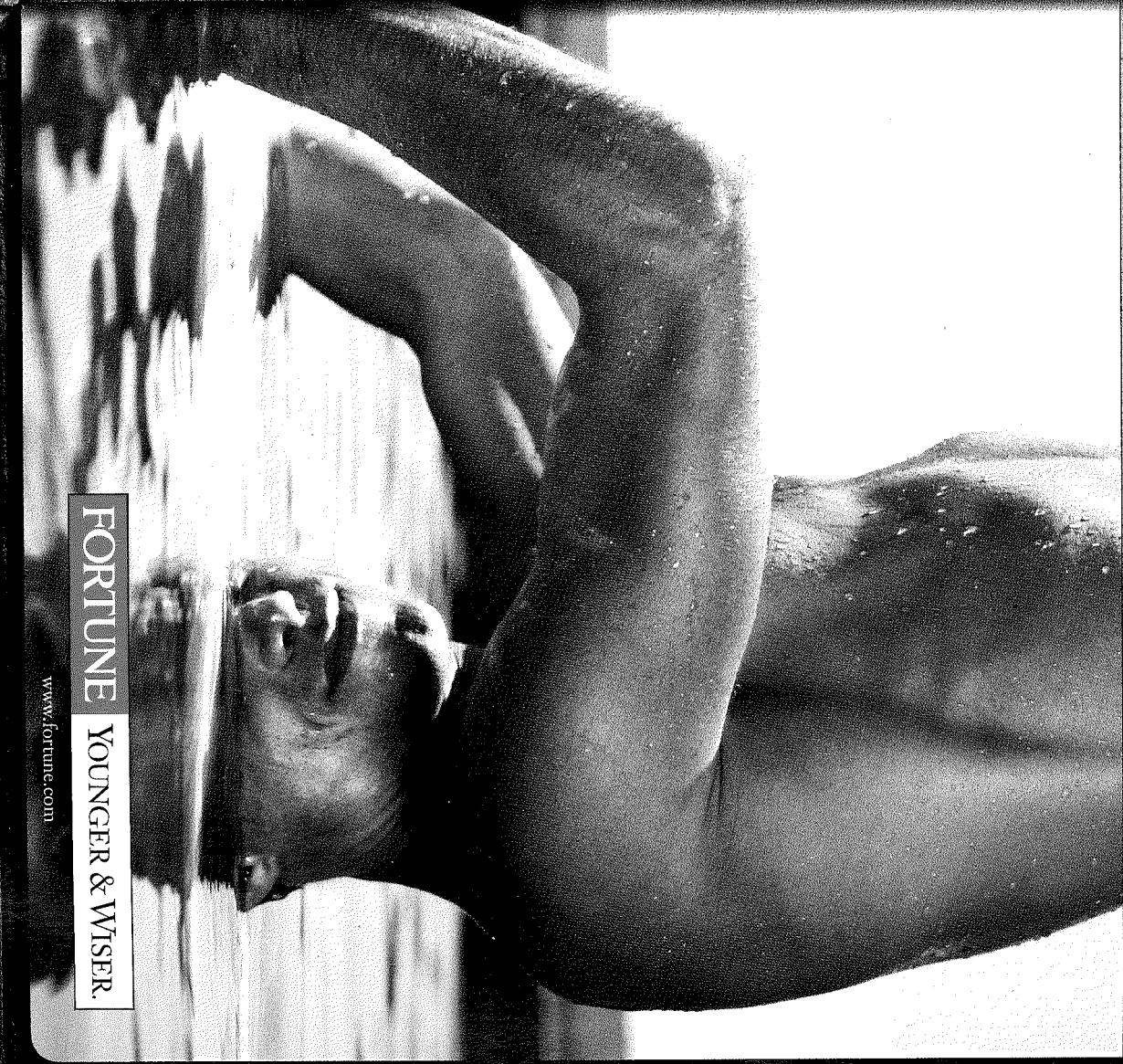
Chris Barr
Editor in Chief, CNET
San Francisco
www.cnet.com

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Squeezing Money Out of the Net

Text by Tish Williams, photographs by Victoria Yee



Intel's Craig Barrett lusts wistfully after nubile young markets, while James Moore of GeoPartners Research (right) and event moderator Scott Shuster (left), a consulting editor for *Business Week*, wish for one-quarter of Barrett's bonus.

Business Week brought together some of technology's heavy hitters to tell the nation's CIOs a thing or two about making money online at its annual Digital Economy seminar, held in San Francisco at the close of 1997.

Sympathy for The Devil

Nothing like a little Department of Justice interference to bring quarreling lovers closer. In an era when Intel and Microsoft aren't exactly blowing kisses at each other, **Craig Barrett**, Intel's president and COO, commiserated with his sneaky compadres up in Redmond over their mutual headache—DoJ investigations.

"There are always anti-trust winds blowing in this country," Barrett said, noting that in Intel's case,

"sometimes they blow the wrong way."

"The Department of Justice comes to you and says, 'We want to see every document, every communication, every file you have and every microprocessor. We aren't sure you did anything wrong, we just want to see if there's something that might show you did something wrong,'" Barrett grimaced. "That's the subpoena we have."

At a company that frisks old ladies when they go in and out of its headquarters building, that must be painful.

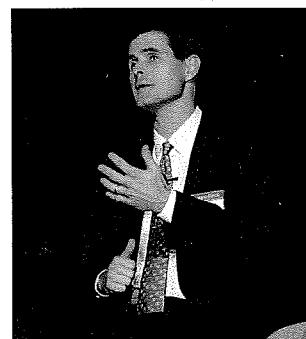
Hype First, Produce Later

After being introduced at a panel of entrepreneurs and VCs as someone who "straddles the investor/innovator role," **Ann Winblad** of Hummer Winblad Venture Partners lamented the bumper crop of new companies and hype created in the Silly Valley this year. Oh, poor little rich girl.

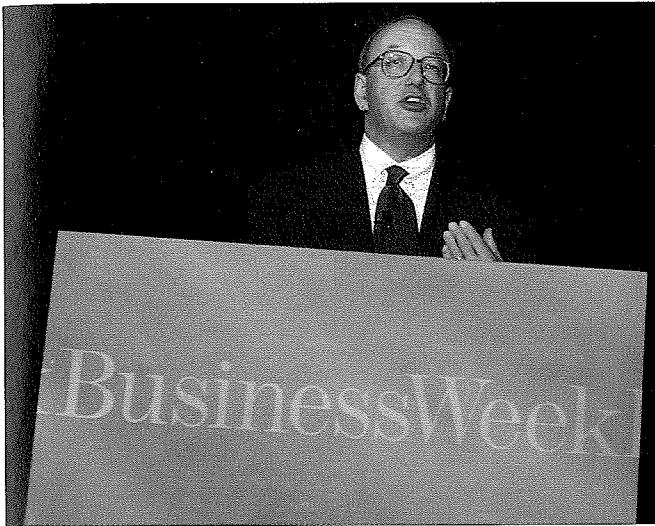
"In the last 18 months, 500 new software companies were created. That's an enormous number—too many," she lamented. This is a bad thing?

"It's been great for PR companies in Silicon Valley. We used to be able to pay \$5,000 a month for PR. Now you couldn't even pay a consultant that fee. We now pay \$15,000 to \$20,000 a month for outside PR counsel," she complained. How sad that VCs aren't the only ones making a killing!

Winblad went on to say that the days of creating a product and then getting funding are over, explaining



H&Q's Dan Case will neither confirm nor deny his eagerness to work for **Merrill Lynch**.



Hewlett-Packard's Lew Platt wants you ... to stop making money smutfully on the Internet.

that hype is a necessary evil in a time when four or five startups pop up in an unproven space: "Now you must take money quickly, or there will be many companies saying they do the same thing. You need to take the money and declare victory immediately. Then create a product."

And what are the hot markets right now? Grab your No-Doz, this is the six-

month window of networking software and distributed enterprise software, like sales automation programs: "Hard, unglamorous software categories. The hardest to find and fund."

Get Your Mind Out of the Gutter

Look out Gore and Doerr, Lew Platt is sounding positively presidential.

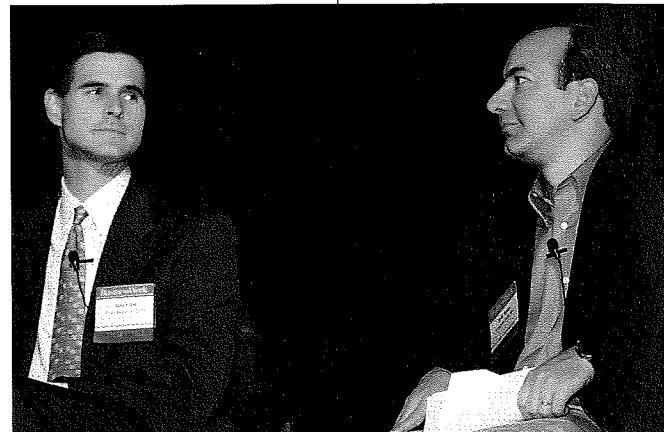
At the same time that Washington, D.C.'s digital witch-hunters gathered to address how to protect children from the horrors of the Internet, Hewlett-Packard CEO Lew Platt got a little Tipper Gore-y himself during his *Business Week* keynote. "The digital economy can truly enhance the way we live and work. We must approach it with a sense of conscience and commitment," he pronounced.

What better way to celebrate HP's jump into the bottomless pit of consumer

brand awareness—and strengthen Platt's position as the man to install on government trade initiatives—than to espouse family values?

Platt rattled off vice after vice on the Internet—from porn sites to local teenagers' stolen credit-card number scams to the murderous hit video game *Postal*.

"TV was supposed to change the way we communicate, educate and learn, and make us more aware of our global surroundings. But TV has dulled our senses, reduced our attention spans,



Amazon.com's Jeff Bezos (right) wonders if now is the right time to ask Dan Case for \$10 to catch a taxi to the airport after recent quarterly losses.



VC Ann Winblad (right) is not the least bit bitter about Marimba's Kim Polese, the one that got away.

reduced intellectual conversations to sound bites," Platt warned the crowd. "It has brought the conversation down to the lowest common denominator, instead of raising the bar to make us think and do more. Now we have the same promise of the Internet."

Platt implored the audience to flex its muscles, keep the Internet from sinking into the abyss and keep it on a more ethically sound plane, ending on a most patriotic paraphrase: "Ask not what the digital economy can do for you; ask what you can do for the digital economy."

In Lew we trust.

Larry or Jerry?

Text and photographs by Tish Williams



Larry Ellison is a riot. No really, he should ditch Oracle and get a stand-up gig. To rattle off jokes like the scathing Bill Gates invectives he's spitting out these days, most people have to stop taking their lithium.

You are still taking your lithium, aren't you, Mr. Ellison?

Not that Larry's ever been

a tongue-in-cheek kinda guy, but it seems the Justice Department's investigation of Microsoft has prodded him to shelve the sticks-and-stones Windows taunts he's been trotting out for the past couple of years, exchanging them for fully au-

tomatic, nuclear-tipped Scud missile attacks.

If his speech at the Churchill Club's anniversary bash in Santa Clara,

You know what they say about tech moguls with big hands. ... Billions slide through their fingers with ease.

Calif. was any indication, we predict Ellison will be rolling out "Gates is so fat" jokes by fall Comdex.

A few samples:

"Bill had one friend in Intel and decided to screw them. He said, 'Gosh, I have one friend. I'm ruining my reputation.'"

"And what are the cable guys thinking? They ask, 'Bill, name all the companies you've worked with in the past, have any of them benefited, too?' And Bill says, 'Don't you want to be the first?'"

"Microsoft's upgrades are like the presidium in the Soviet Union. They ask 'How many size 9 brown boots should we make that year?' Some guy says, '1 million.'"

Larry, really, quit your day job.



Oracle's Larry Ellison reaps the benefits of his Oprah stint as gaggles of matchmakers try to fix him up with their lovely relatives.

The Ethel M. Internet catalog offers more than 60 unique chocolate creations, including their famous chocolate liqueurs.

From the middle of the Atlantic came an order from a woman whose appetite went beyond twenty-four-hour catering. Her cruise ship gave her everything she could possibly desire. Except her favorite chocolate liqueurs. Never one to be unsatisfied, she did a quick Internet search on the ship's computer and found Ethel M. Chocolates' online store. By the next port-of-call, she met her custom-ordered box. Unfortunately, she lost half the chocolates in a bribe to Customs.

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Gates Is the Boy Next Door

Text and photographs by Tish Williams

Nothing like a good, substantive Comdex keynote. Bill Gates gave us his aw-shucks routine and told us about the People Against Poodles Web site.

His Sunday night opener was eagerly awaited by all those wanting to hear what the richest man in America has to say now that Janet Reno is yanking his chain. But the crowd was greeted by the three PR faces of Bill (insert "Amazing Grace" here as background music): Bill the regular guy, Bill as American as apple pie and Bill the head of a mediocre software company.

We knew the last one.

Gates came out grinning with his version of Scott McNealy's signature Microsoft-bashing Top 10 list. Gates' "Top 10 Reasons Why I Love My PC" as follows:

10. I love using Barney software with my 18-month-old daughter. Now I constantly find myself humming Barney songs.

9. Every function in my new house is managed by the PC—and sometimes it works. ... I'm the only one who can get an NT error function when I try and flip on the light switch.

8. What other machine allows you to "plug and play," "embrace and extend," and "link and embed"?

7. With electronic mail, anyone can send me their thoughts with the click of a button.

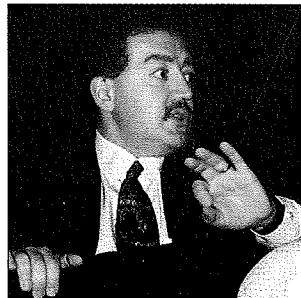
6. I can program in any language I want.

5. In just one weekend I can sit at my PC, collaborate with attorneys all over the

world, comment on a 48-page legal brief and e-mail it to the Department of Justice.

4. I can gather information on the Internet so I make sure never to repeat myself in speeches. [At this point, Gates rolled a long self-deprecating video clip mocking his own repetition in various speeches, poking fun of his favorite buzzwords—"digital nervous system," "manageability," the grammatically reprehensible "very very" and even his sneezes. What a guy.]

3. I do my best work using my laptop on the air-



Eric Benhamou (above) of 3Com will leave today's "one size fits all" networking approach in the dust. Michael Dell (below) wants a PC monitor this big, but he still won't watch PC-TV on it.



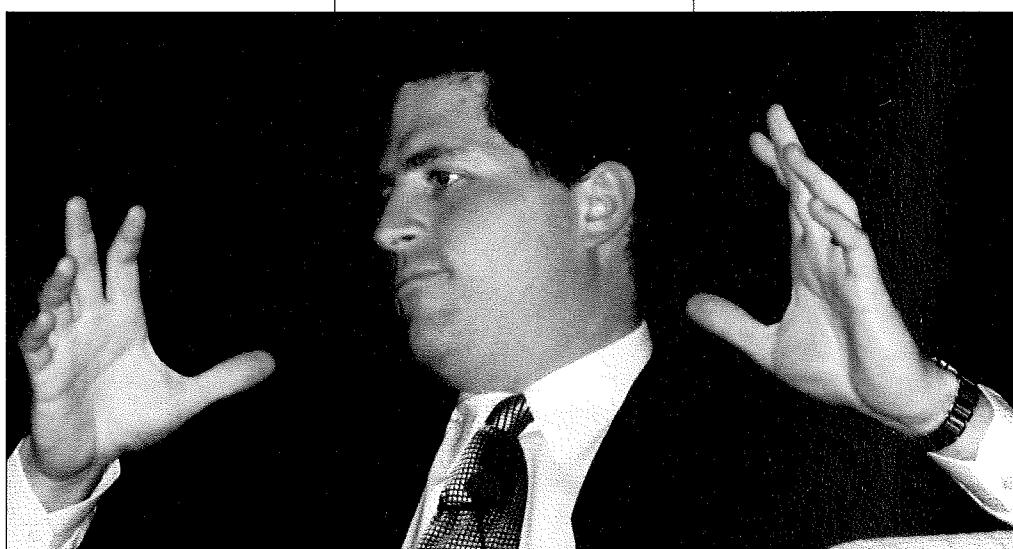
The Onion out loud and whisper sweet nothings to his wife over the phone.]

1. I can use Microsoft CarPoint to show Ralph Nader my Corvair collection.

But that wasn't all. Gates brought out someone considerably greater in physical, if not financial, stature—Kareem Abdul Jabbar. How could Janet Reno want to punish a man who meekly scampered under Jabbar's arms to guide the mouse and surf through the basketball star's site when Jabbar wasn't able to master the art of the double click.

Finally, Gates went sitcom slapstick with a video in which he and Steve Ballmer spoofed a current Volkswagen TV ad: They drive around town bobbing their heads to music and pick up a Sun machine left on the curb. After a few minutes of driving around, it begins to stink, and the machine gets deposited curbside once again.

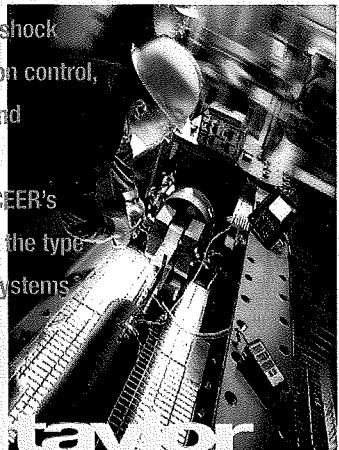
That rascally Bill Gates—he doesn't mean any harm.



It just happens

The path started with the National Center for Earthquake Engineering Research (NCEER) at the State University of New York at Buffalo and the relationships they had created.

Taylor Devices, an innovator in extreme shock and vibration control, designed and produced, with the NCEER's assistance, the type of proven systems necessary.

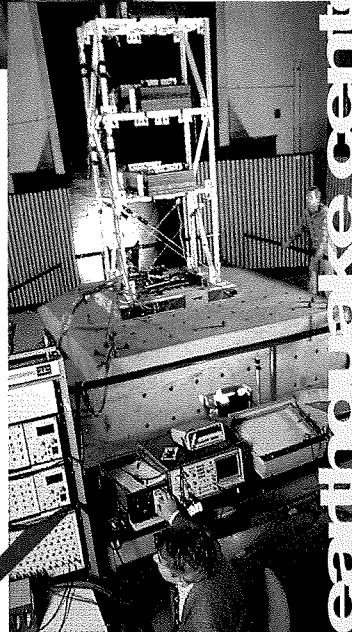


Rising into the Kuala Lumpur skyline, the Earth's tallest building, Petronas Towers, is an architectural and engineering achievement of the highest order. Not just because of its incredible 452-meter height, but also its spectacular 42nd floor connecting skywalk. On its journey from vision to reality, design engineers required the latest in motion damping technology for the world's most unique skywalk. That put the project on the strategic path that led straight to the ABCorridor. A place where ideas accelerate. Problems get solved.

petronas towers



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accelerate

Internet World Money Madness

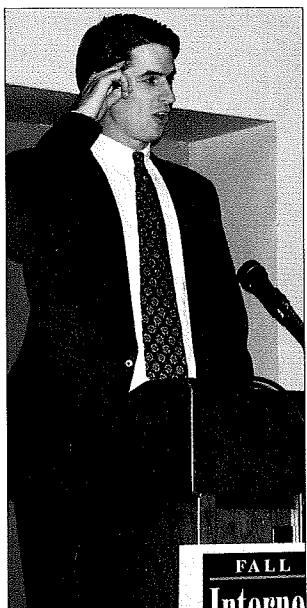
Text and photographs by Tish Williams

In a December week when Oracle CEO Larry Ellison lost \$2.9 billion worth of his ego (we're guessing he still has a little left), tech gurus who make, advise and woo the money on Wall Street met at Internet World to take some of the mystery out of the big boards. The two-day Internet Finance Symposium put star money manipulators in the hot seat.

Gurley's Law

The tallest man in tech, Hummer Winblad Partner Bill Gurley, spat at Silicon Valley's option-driven "free-agent effect." He compared Internet startup whiz kids to baseball and football stars: "You end up with mediocrity and temporary champions."

How to find a long-term winner? Gurley gave individual investors the following tip to avoid getting their buns burned by moody tech stocks: "Your stock will



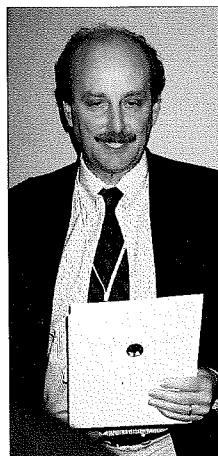
FALL
Info

eventually trade at or below 30 times earnings."

Take that down as Gurley's Law, soon to grace Econ 101 textbooks nationwide.

Wink Wink, Nudge Nudge

Stock market sibyl Rick Sherlund of Goldman Sachs proclaimed his innocence after Oracle's swan dive: "Last week I changed my rating on Oracle from 'purchase' to 'market outperformer.' If you're an individual investor you



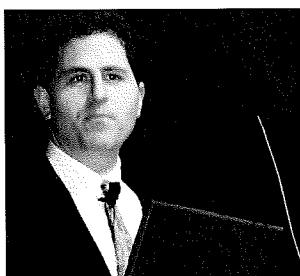
Clockwise from top left: Jeff Bezos (Amazon.com); Will Hearst (Kleiner Perkins Caufield & Byers); Rick Sherlund (Goldman Sachs); keynoter Michael Dell (Dell Computer); Ann Winblad (Hummer Winblad); Rob Glaser (RealNetworks); Mary Meeker (Morgan Stanley); Steve Case (America Online); and Bill Gurley (far left, Hummer Winblad).



might say, 'Oh well, he still thinks it's a good buy.' But the institutional investor says, 'He doesn't like it well enough to have a buy on it.' You need to get out."

It's all in the body language: Sherlund shrugged his shoulders in response to *Wall Street Journal* slams and The Street's complaints about analyst slants. "You do underwriting on companies and put out a sales hold, you're not going to get a lot of underwriting work in that field. There's a lot of pressure for positive reviews."

As for the pixie dust game of estimated earnings? Sherlund explained that



companies warn him when he's aggressive on his estimates. "We're all sort of moved into line to let companies beat their numbers," Sherlund said.

Shocking! We thought he consulted the Magic 8-Ball.

Be Patient

Morgan Stanley dynamo Mary Meeker warned individuals that there may not be much cheap real estate in the wild frontier of Internet stocks. "The interest in this space is so high it's like saying I want center front row seats at the Garden to see Barbra Streisand and I'm betting against Donald Trump," Meeker said.



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Tech Drools Over Asian Markets

Text and photograph by Tish Williams

High-tech leaders dusted off their smiley faces for an Asia-Pacific IT Summit hosted by the Pacific Economic Corporation Council and emceed by Intel CEO Andy Grove.

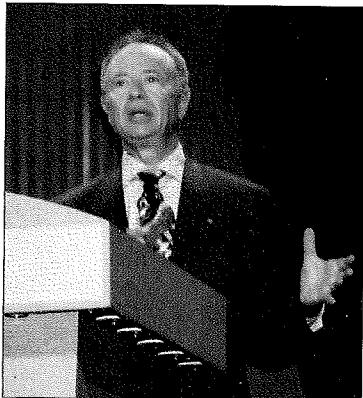
No matter that currencies are crumbling, censorship is sometimes embraced and intellectual property is, er, do-nated for the good of the people. Minor details, said trade-happy execs.

Will Rupert Murdoch get thwarted in Asia? No way! Problems with the Chinese government? Nah. Drop the BBC off his satellite network to keep the new capitalists happy? Pshaw. Everything's

shiny and happy down under, or so Murdoch said.

"DBS, in collaboration with the government, can provide multichannels as well as government information and telemedicine," Murdoch said, nothing if not Mr. Nice Guy. "The moral and social values of a country must be taken into account for success. In rural China, we can do multimedia training, and the cost of services can be subsidized. Education during the day, advertising-supported material at night."

Murdoch giddily discussed China's 240 million TVs and Vietnam's 90 percent TV penetration rates,



Andy Grove absolutely adores Asia's lucrative, hassle-free markets.

pushing set-top boxes to get locals paying for services. But the sobering cost of entry is as high as the potential revenue. Murdoch flaunted \$1 billion in investment in Hong Kong —no wonder he's willing to cater to the Chinese govern-

ment's whims—as well as News Corp.'s Star TV Network, which reaches 53 countries in Asia and the Middle East, and a Web venture with the *People's Daily*.

Even Japan causes Murdoch headaches, though he appears to be going strong with his Japan Sky Broadcasting satellite venture (despite tricky dealings that forced Murdoch to return his shares in Asahi National Broadcasting Co., after breaking ground as the first foreign company to invest in Japanese TV). "Japan remains a tough and competitive market," Murdoch shrugged.

But will it be worth it?

From the Mouth of Hagberg

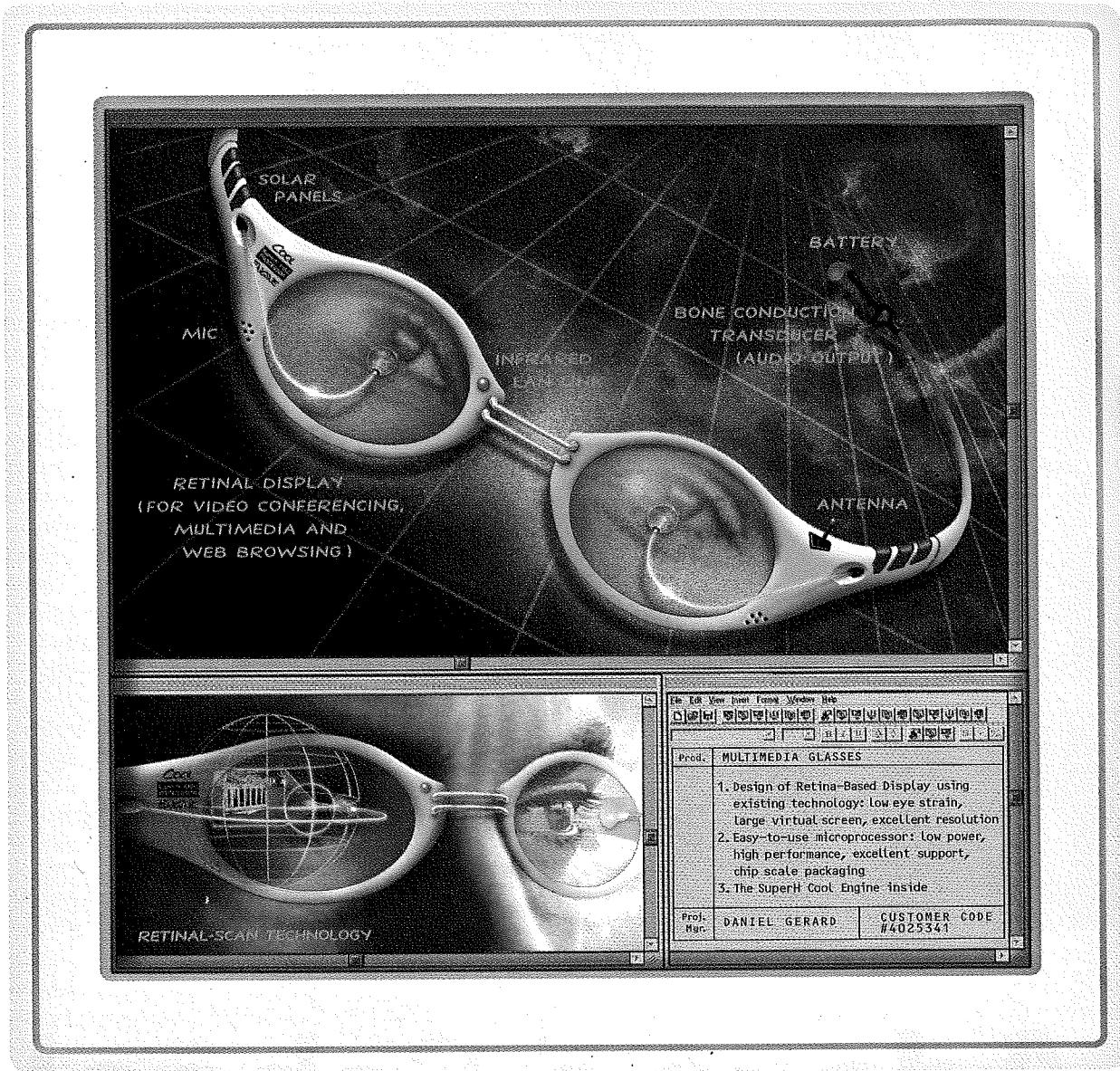
Treating "the CEO" as if it were the ringtailed lemur, Hagberg Consulting Group of Foster City, Calif., provided a hard-hitting look at the behavior of CEOs in the wild world of corporate parties.

What They Said

A 14-year study.
The CEO views work as play and play as a waste of time.
The thing that is deceiving about the CEO is that he or she can be charming and even the life of the party at certain functions.
But usually it is a function with clients or with a business purpose.
The CEO won't view the office party as the best business opportunity of the year.
After all, he or she could be scoring points with clients, rather than employees, during the holiday season.
CEOs are more serious, self-denying and focused on work than 67 percent of all other executives.
Eighty-four percent of CEOs are not as fun-loving, pleasure-seeking or jovial as the average person.

What They Meant

We have never made a dime studying this.
The CEO would view this study as more than a waste of time.
All work and no play makes Jack a dull CEO.
You can't fit the whole company in the limo to ride to four-star restaurants. We tried.
Free crab cakes from billing and annihilating the competition at the limbo are a hoot. But they do not equal a good Herb Allen Sun Valley, Idaho, deal-a-thon.
There are better cheeks to be kissing under the mistletoe.
Funny how those front-page <i>Wall Street Journal</i> articles on compensation scrutiny cut down on naked tabletop dancing.
But they get to fire many fun-loving, pleasure-seeking, jovial average people.



These Glasses May Not Exist Yet, But The Microprocessor For Them Does.

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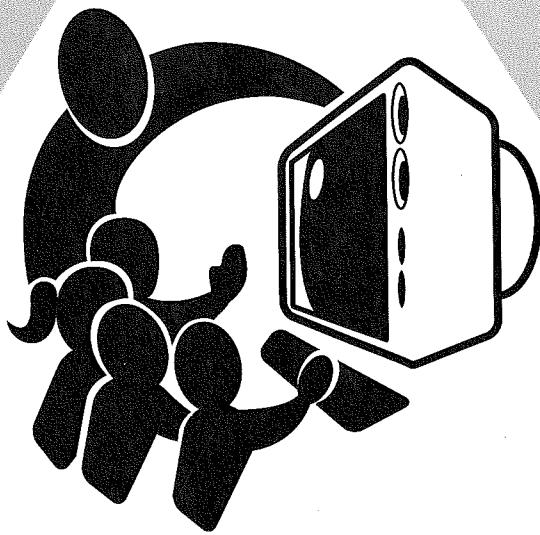
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Barkat's Big Leap

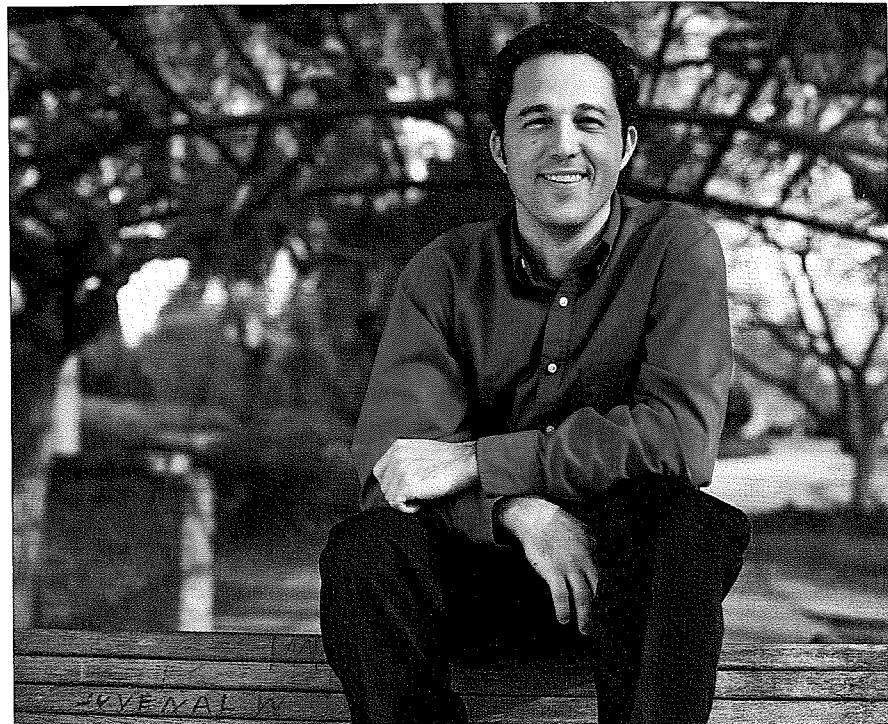
by Rochelle Garner

Eli Barkat has led Israeli paratroopers into the maw of death, executed an about-face on his career path and helped found four technology companies. Now the founder and CEO of BackWeb Technologies Inc. (www.backweb.com), which provides software to harvest information from disparate sources and deliver it to the customer's desktop, faces a challenge that would quell less-hardened entrepreneurs. Barkat needs to reposition the San Jose company to straddle last year's hype—push technology—and this year's big buzz, "knowledge management." Oh yes, and somehow devise a marketing message that can be heard above the din. Think of it as standing between two strutting rock bands while wooing the audience with a plaintive ballad.

It's a perilous tactic. "The danger is in getting lost in the noise," says Stan Lepeak, vice president of The Meta Group in Stamford, Conn. "BackWeb does need to do something to get beyond push, but I'm not positive this is the way to go. Still, if you're going to jump into a market, you may as well go into one that has a lot of people working to make that market big. Marketing and sales are paramount here; the product is tertiary."

The reason product rates so low is confusion over an amazing array of software—from search-and-retrieval tools to decision-support systems, data mining, data visualization, intelligent agents and, yes, push technology—being touted for knowledge management. Why such *sturm und drang* about an amorphous market?

It's on corporate customers' radar screens, that's why. Gartner Group Inc., also of Stamford, says U.S. companies paid consultants \$1.5 billion in 1996 for advice on knowledge management, and predicts those fees will climb to \$5 billion a year by 2001. "We believe knowledge management is the CEOs' initiative of the decade," Barkat says. "I don't want



MARGOT HARTFORD

Eli Barkat is leading his troops at BackWeb into a treacherous producer space.

to talk about push because people ask, 'What will be pushed at me and who says I want it?' Push is strictly a technology sell. But by talking about knowledge automation and distribution, we can sell benefits."

Benefits to the corporate market, that is. Nearly every surviving push-technology company has redirected its attention away from consumers and toward the workplace. Here's why: Consumers became inundated by information for information's sake, and the push market got a bad rap. But corporations need to get all sorts of data to their employees' desktops, including software updates, company directories, news from the Net and data from corporate databases. You name it, employees need to see it—as long as the data appears in a way the company and its staff can manage. "Knowledge management is hot right now," says Gartner Group ana-

lyst Maureen Fleming. "It has the same feel the Internet did in 1993."

"Push doesn't explain anything about what you accomplish with the technology," says John Powers, a managing director at BancAmerica Robertson Stephens in San Francisco. "But knowledge management is a broad enough category that there needs to be a specific set of marketing and sales messages," he says. "If you're going to tackle a large, open-ended space like that, you have to get glowing early testimonials from customers and flawlessly put together your execution team. If you do it right, you can define an industry around who you are. Knowing Eli Barkat, I'm optimistic about their chances."

Most people who know the 34-year-old Barkat—with emphasis on the word know—would agree about this quiet, deeply reserved CEO. "Eli doesn't ooze vision or communicate expansively," says Charlie

Federman, chairman of Broadview Associates LLC (www.broadview.com) in Fort Lee, N.J., a BackWeb investor and Barkat's longtime friend. "What he does have is the ability to cut to the heart of an issue and come up with an innovative solution. I've learned to listen carefully when he speaks. To me, he's one of the five best young CEOs in this industry, and I would love to invest in him over the next 10 years."

That's quite a testimonial. Another comes from BackWeb investors who, along with Broadview, have staked a combined \$19 million in seed and first-round financing. These include Intel Corp. of Santa Clara, Calif., Goldman Sachs & Co. of New York and SoftBank Corp. of Japan. Why their vote of confidence in someone so outside the mold of the typical Silicon Valley CEO? Perhaps because Barkat possesses that intangible but oh-so-vital trait: the ability to marshal his troops toward a difficult goal.

Barkat began to hone that skill at 18, when, like all young Israelis, he faced a mandatory stint in the Israel Armed Forces, where he immediately volunteered for the elite Paratroop Corps. Six months later, Israel's engagement in Lebanon began. During the next four years—past his government-required term—he led his troops into the horror of battle, carried wounded soldiers to safety and told weeping mothers their sons would not return.

That crucible taught Barkat to think and behave like a leader with a capital L. "One of the things you develop as a paratrooper is [the ability] to make decisions on very little information, make them fast and figure out the wrong decisions before they kill you," says Barkat from BackWeb's gray-toned, no-frills office near the San Jose International Airport. "The experience absolutely builds you to where you can face tough situations. Now, the tougher the challenge, the more I smile and the calmer I am." You could say Barkat's war experiences turned him into a challenge junkie, which explains his decision at age 22 to leave the army, despite achieving the rank of lieutenant.

Barkat attended Hebrew University in Jerusalem, where he took honors in computer science and mathematics. Then he went to work, writing code for Orek, an Israeli communications company, and for CAD developer Daizix Technologies Ltd., also of Israel. But working for someone

else wasn't Barkat's style; he needed a challenge rush. So in 1988 he and his brother, Nir, became the "B" in BRM Technologies Ltd. (www.brm.com), co-founding the software-development company to produce anti-virus software. But a funny thing happened after developing software for Fifth Generation Systems Inc. of Baton Rouge, La. BRM transmuted into a completely different sort of company. By the early 1990s, it had become an incubator for Israeli startups addressing brand-new markets.

BRM has a business model like no other.

**"This will either be
a wonderful success
or an abysmal failure
because you are so far
out in front."**

Have a great idea but no business plan? No problem. For about half the startup's equity, BRM will devise a plan, provide seed capital and supply the company's initial development and management teams. When the startup is mature enough, BRM helps the company hire an executive team and brings in additional investors (this process usually happens during a company's first two years). That's how Check Point Software Technologies Ltd. got its start (see "The New Guard on the Net," February 1998, page 53). Ditto for MediaPath Technologies. Eli Barkat helped start both as vice president of business development. In those cases, the idea came from outside BRM. BackWeb, however, is Barkat's brainstorm.

Intriguingly, the idea of a system that would gather information from multiple sources and automatically send it to a customer's desktop occurred to Barkat long before PointCast Inc. burst into the public's consciousness. "Three years ago, Eli sat down and described BackWeb to me," Federman says. "And I remember saying, 'This will either be a wonderful success or an abysmal failure because you

are so far out in front. There will be no middle ground.'"

The challenge apparently agreed with Barkat. In fall 1995, he took a leave of absence from BRM, where he is still a partner, to become BackWeb's CEO, moving the company from New York to the heart of Silicon Valley. By December 1996, the company delivered BackWeb 1.0. A year later, it released version 4.0, now called BackWeb Infocenter. "BackWeb has a product that's technically superior," Fleming says. "I see BackWeb as a required delivery mechanism for knowledge management. I feel more comfortable recommending it to my clients than I do other companies with better publicity." BackWeb has already signed up 150 corporate customers, including Fidelity Investments, Allied Signal, AT&T, Digital Equipment Corp. and Lufthansa Airlines.

That's great—for the moment. But the trick will be how BackWeb plants a stake in a space filled with quicksand. Somehow, the company must provide the killer app in a confusing market. "I like that there are tons of people in the knowledge management space, with no integrated product and no strong delivery approach," says Kelsey Selander, BackWeb's vice president of marketing. "We plan to define this ill-defined space really well, so that no matter what customers want to do, they will use us." Oh right, that sounds easy.

But given Selander's track record, it could work. She was the one at Lotus Development Corp. who was responsible for turning Lotus Notes into the application that finally defined the groupware category. If she could pull off something similar, she and the rest of Barkat's team may achieve the same success with BackWeb. For now, it's too soon to know if his troops face serious obstacles or can attain their objective. One thing is certain: Barkat won't stop trying. "Eli is one of the most determined people I've ever met," says Broadview's Federman. "He doesn't allow himself to lose—will not lose."

Barkat's is a quiet strength forged by fire. Don't look for flag-waving, rousing speeches or entrenched stubbornness from this CEO. But do look for him. He has the knack of getting what he goes after. ■

Rochelle Garner (rgarner@well.com) has been writing about business and technology for 15 years.

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A black and white photograph of a person's face, heavily obscured by a dense, diagonal pattern of binary code (0s and 1s). The person has dark hair and is looking slightly to the right. The background is dark and out of focus.



The Face of Innovation

By Robert Buderi

Ever wish you'd gotten a peek inside Xerox's famed PARC lab in the early '70s, or been a fly on the wall at Bell Labs while it was pioneering the transistor, the laser or cell phones? It would have been like peering into the future.

This column, based on tours of corporate labs in Japan, Europe and the United States, will profile innovation at top research organizations around the world. Some ideas showcased will soon hit the market, while others are the stuff of far-off dreams. But from micromachines to novel input devices, all will fire the imagination.

Before viewing these labs, though, let's consider how some organizations foster creativity while others seem to stifle it.

Standout innovations need standout researchers, but that's only a first step. Far more difficult is turning exciting ideas into things that matter. I've borne witness to many strategies, from touchy-feely teamwork training to hard-wired number-crunching. These can work or fail, depending on lab style, culture and implementation. However, the best companies seem to share a few simple measures that help forge a framework for successful innovation. No one I've met sums these up better than Lee Davenport.

At age 82, Lee is restoring vintage cars and caravanning in road rallies. But as a physicist and industrial research director, he has enjoyed a ringside seat on the electronics age—from tubes to chips, analog to digital. He's seen ideas come, go and come again. So Lee offers a rare commodity these days: perspective.

During World War II, at the top-secret M.I.T. Radiation Laboratory, Lee helped create a revolutionary fire-control radar instrumental in shooting down buzz bombs over England. After the war, he

spent 15 years as research director for General Telephone and Electronics, now GTE Corp.—then and now a major local phone service provider (it also owned Sylvania). Under Lee, the lab patented the bright red phosphor now ubiquitous in TV displays. In the pre-optical fiber days of 1963, as a publicity stunt to demonstrate light's capacity to carry signals, he appeared on "I've Got A Secret" with GTE's scheme for transmitting TV pictures via lasers. When

results, not effort or job difficulty. "You must expect your R&D people to produce results and reward them accordingly."

2. Since most projects last several years, break them into segments, with measurable goals for each phase.

3. Never allow general goals. Avoid such words as advance, investigate, study, explore. All are false, immeasurable goals.

4. Look for and encourage idea people. Only a few individuals have unique, even hare-brained, ideas. Don't knock them.

5. Find product champions—internal entrepreneurs who understand technology, explain it clearly and can push ideas through corporate barriers. These traits typically elude top researchers.

6. Keep a little something on the side. A bootleg budget is sometimes the only way to pursue ideas that break the mold.

7. Hire young blood. A research staff's average age should not increase even one year annually. A nice average is under 35.

Innovation alone can't save a company. But when done right, it provides a critical leg up, either through myriad small-scale improvements or a legendary breakthrough. The best organizations cultivate innovation by creating a climate that connects staffers to the real world, but also encourages out-of-the-box thinking. This column aims to provide a unique glimpse into that ongoing struggle. As Lee says, "Research is never just a gamble. You can definitely shape the odds in your favor." ■



Lee Davenport, left, atop an experimental model of the SCR-584 gun-laying radar during the early days of WWII.

panelists failed to guess his "secret," Lee revealed the laser. Smoke blown across the stage allowed viewers to see its red light. Lee then interrupted the broadcast's video portion by placing his hand across the beam.

I recently visited Lee at his home in Greenwich, Conn. Around a lunch of baked chicken and fried Northern Spy apples, Lee dug through notes from his days lecturing at the University of Virginia's Darden School of Business and culled seven common-sense rules of corporate research. These gems represent basic steps proven to set the stage for innovation.

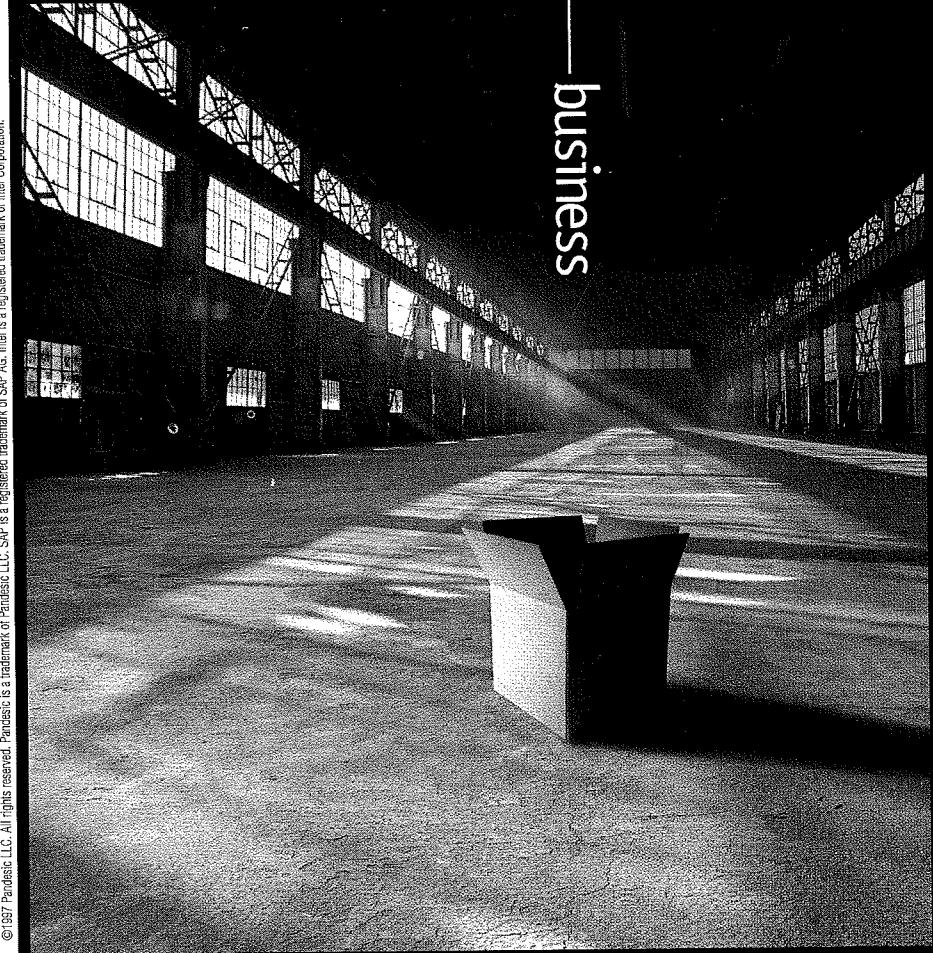
1. Success is based on schedules and

Former *Business Week* technology editor Robert Buderi (radarwar@world.std.com) is the author of *The Invention That Changed the World* (Simon and Schuster, 1996), the story of World War II radar and its effects on post-war science and technology.

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Here's Looking at You, Kid

Every once in a while a product comes along that no one wants, yet no amount of consumer apathy can convince the companies trying to market the product that it's a hopeless cause. They've either got reams of research data to the contrary or an engineer-like conviction that because designing the product was technically difficult, it must be wonderful and, therefore, people will soon clamor for it.

I'm not exactly sure why AT&T and a few other companies have been trying to foist the videophone on us since the 1964 World's Fair, but it's one of those inventions that simply refuses to die. Ironically, it looks as if the device you might want won't come from AT&T or the phone companies, but from

Intel and a host of other computer companies including Best Data Products, Boca Research, Diamond Multimedia Systems and 3Com, which will market desktop video kits consisting of a video capture card, a camera and software. At long last the product stands a reasonable chance of succeeding.

The major complaint about the videophone was that there were many times when people simply didn't want to be seen. Do you really want that telemarketer to see you in your bathrobe or your boss to see you in golf togs when you're calling in sick? Being able to choose when you use it without incurring the other party's suspicion if you turn off the video part of the phone may well be the key to the product's success. Enabling the computer rather than the telephone means that you don't have to see people or let them see you whenever you pick up the phone. To make video calls, both parties

must have installed desktop video kits, pre-arranged the call and fired up their PCs at the appointed time. It's the extra effort required that will make the difference: You have to really want to see the other party to bother with all of this.

As part of its relentless quest to compel users to consume more MIPS, Intel had been unsuccessfully trying to push desktop videoconferencing for a couple of years via its ProShare software. Now

the company has finally realized that providing a complete solution, including hardware, is a better way to go; it has come up with a chip, the MMX, that has specific features to facilitate videoconferencing. Not only is Intel selling a retail "install-it-yourself" kit, the Intel Create & Share Camera pack, but it is also working with

major PC vendors, including Compaq, Hewlett-Packard, IBM, NEC, Packard Bell and Toshiba, to offer a pre-installed videophone option on a number of new consumer PCs.

In case Granny doesn't have a computer or isn't up to installing a PCI card, a couple of companies are marketing a settop box-like solution that includes a modem and uses the television as a monitor. Santa Clara, Calif.-based 8x8 Inc. is offering the ViaTV Video Phone (www.viatv.com) for an estimated price of \$449 at major retailers including CompUSA and Staples, and catalogs like Hammacher Schlemmer and the Sharper Image. Wilmington, N.C.-based C-Phone (www.cphone.com) offers C-Phone Home for \$649.95, or \$299.95 when purchased with a separate video network service agreement priced at \$9.95 a month and 29 cents per minute.

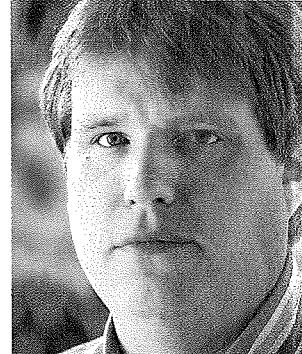
Then there's the potential for security

use: Desktop video cameras not only permit video conversations, but also one-way surveillance. Imagine being able to spy on your nanny in real time from your office or being able to see who's ringing your doorbell before you answer it. Yes, you can do these things with a regular video camera, but they are much more expensive and don't allow remote access as easily.

This is still a product category best suited for early adopter types. Even though the H.324 videoconferencing standard supposedly makes all products adopting it interoperable, reviews indicate that products from different manufacturers often cannot communicate with one another. For now, it's safest to make sure that the party you need to talk to has the same equipment that you do. You also need a full-duplex sound card and a modem that's V.80 compatible.

These kits aren't of much use to business users yet; they are designed to work over POTS lines and, at a maximum of 15 frames per second, the video quality still leaves much to be desired—not exactly the kind of system for con-

ducting that crucial meeting. And when I say they'll be successful, I mean by computer industry standards, not by phone company standards. Desktop videoconferencing isn't something that will be common in five years, but it will probably be in a respectable number of households with computers. Just don't expect every household to have one by the year 2000, like AT&T did. ■



David Coursey
is an industry analyst, editor of *coursey.com* and host of Upside's Internet Showcase. His e-mail address is dcoursey@upside.com. Lisa Halliday contributed to this column.

All You Can Stomach

By Michael Roney and Michael Utvich

Announcing a new tech product is not unlike hawking vulcanized foodstuffs for "International Day" at the local high school cafeteria. Take a tired recipe, smother it with a leaden sauce and mysterious chemicals, and voilà, you have the schlock du jour. Here in our new product restaurant from hell, you can count on a variety of suspicious treats, complete with the requisite dog-and-pony show. Do any of these aromas smell familiar?

The "Good Morning!" Prune Special

This recipe involves a daily succession of mostly blank magazine ads, garnished with perhaps a single enigmatic word or phrase—"think," "prepare," "get ready to Java"—and wickedly designed to give readers that expectant, er, pent-up feeling. One thing is sure: The payoff, usually in the form of a 10-page *Wall Street Journal* supplement and a flood of demo disks, will contain more roughage than substance.

Zuppa de Pesce

In this dank, swirling mix, the vendor attempts to display credibility—or at least demonstrate a fighting chance of making it to market—by cajoling and threatening a small army of developers into pledging allegiance to the technology in question, crowding onto the stage during the announcement and squatting in a ghetto of small, shabby cubicles known as the "Partner Pavilion." Ask yourself whether you can truly identify everything that's floating in this broth.

The Big Bill

A mega-auditorium event seasoned with reverential developers onstage, topped with an Industry God and slathered with self-serving pronouncements on how some new proprietary technology will help us "work better and smarter." Of course, there's the obligatory "special guest" via satellite and the tightly controlled whiz-bang tech demonstration. So what if the Industry God looks more like the King of the Ants under that giant video screen and the whiz-bang goes kaput at least once (leading to a nostal-

gic cameo by autoexec.bat)? The trick is to chew thoroughly before swallowing.

Amish Surprise

This is heralded by that "mystery party" invitation sent out three to four weeks before the event, promising that you'll witness "a paradigm shift" in this "industry-shaking announcement," which will be accompanied by the appearance of "special guests," all at one of those restaurants overlooking the twinkling lights of the big city. The reality is that at the time of the mailing, the marketing team had only the vaguest clue of how to position the company's new widget and was scrambling for a real theme and endorsements. Bring a Snickers to compensate for that empty feeling.

Pig in a Blanket

Known in less discriminating circles as the "keynote bombshell," this is that tried-and-true concoction where the guest CEO, in a cynical attempt to undercut the value of competitors' tools, blurts out a startling product announcement in the middle of a speech. Although the announcement is designed to appear impromptu, you can bet your technology patent that the small army of flacks surrounding the auditorium are waiting patiently with press releases. Wash down with plenty of unfluoridated tap water.

The Edward R. Murrow Club Sandwich

This is the trendy, closed-circuit, multiple-city televised announcement where thousands of local journalists, MIS specialists and common dweebs are lured into theaters across the land with the promise of a historic event stacked high with meaty technology announcements and CEO product demos. Expecting hearty fare in an exciting milieu, the victims usually end up with an experience more akin to Jaycee night at Medieval Times.

The Zeppelin Burrito

This concoction, more filling than nutritious, involves plenty of hot air and color-

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ful dressings, usually in the form of a rented blimp or hot-air balloon, garnished with some kind of tired, pseudo-military or lighter-than-air theme and an appropriately costumed has-been TV star. Make sure you have some Gas-X handy.

The Omaha Wallbanger

Thirsty yet? When two stocks nose-dive, it's time for a partnership, the shameless presumption being that the gestalt of two losers is a sure winner. This intoxicating mixture is ingenious because the participants don't even have to mention a product; they just play the anthems of the industry giants in question, usually at an ostentatiously "by invitation" event held in a basketball arena. Gossip plants in advance of the event entice the casually interested, and by the time the CEOs appear onstage together like two buffaloes in springtime, there's a mob in attendance to imbibe the fumes of the obligatory vaporware promises. ■

Michael Roney and Michael Utvich closely monitor their hydrogenated-fat intake and are authors of the *Guerrilla Guide to High-Tech Trade Shows*, published by Random House. Contact them c/o feedback@guerrilla-guide.com. You can sample and order the book at <http://guerrilla-guide.com>. Guerrilla Guide is a registered trademark of Real Communications Inc.

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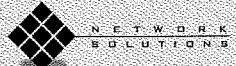


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Wall Street Meets "Entertainment Tonight"

Matchmaking is not usually my forte, but I can't help thinking that two of the Internet's more attractive players would make a lovely (and highly profitable) couple.

The prospective groom? The online securities trading industry.

The blushing bride? Entertainment fantasy-game "stock markets," in which participants buy and sell fiat "shares" in movies, actors, sports figures and other pop culture icons.

In contemplating a marriage between these industries, I must first consider the groom's "prospects," as it were. And they look fine indeed.

"Online securities trading is one of the standout successes of Internet commerce," notes research analyst Bill Burnham—and that's putting it mildly. Burnham's recent study for the brokerage house

Piper Jaffray predicted that commissions derived from Internet securities trading will increase fourfold—to \$2.2 billion by 2001, from \$628 million in 1997. That figure will represent 60 percent of all discount commissions and 10 percent of all retail stock brokerage commissions.

Other studies confirm Piper Jaffray's estimates. Forrester Research predicts that the number of people holding online trading accounts will jump from 3 million today to more than 14 million within four years. These traders will wield \$688 billion in assets, notes Forrester, and will be responsible for as much as 20 percent of all trading volume on Wall Street, up from today's already enviable 4 percent of total stock market activity.

What accounts for online stock trading's enormous success? First, there's the fact that the Net's rapid-response searching,

filtering and information-retrieval capabilities make it easy to research stocks, track prices, access timely news and buy or sell securities efficiently. Second, the demographic profile of Internet users (affluent and highly educated) tracks perfectly with the profile of active individual investors, who largely manage their own portfolios.

That said, however, my duties as a virtual matchmaker require me to examine the eager groom's, er, "fertility." And I have to say that not only has the online stock business been hugely successful

with regard to trading existing securities, it has also proved extraordinarily prolific at siring new kinds of financial products and services.

Since the Securities and Exchange Commission granted approval in 1996 for online IPOs, for example, more than 50 direct public offerings (IPOs sold directly to the public via the Internet without the mediation of underwriters and brokers) have taken place under the auspices of companies such as Direct Stock Market, IPOnet and Wit Capital. Moreover, all manner of bonds are now being sold online, as are options and futures, including new, El Niño-related insurance industry "storm futures." Even venture capital funds have gone online since Technology Funding won the National Association of Securities Dealers' approval to sell "retail size" shares as small as \$1,000 in its VC fund.

And what about the blushing bride? The entertainment fantasy-game "stock markets" can bring a hefty dowry to the marriage. While precise figures are unavailable, I'd estimate the total number of users of sites such as the Hollywood

Stock Exchange, Wall Street Sports, Rogue Market, Mr. Showbiz' "Box Office Challenge" and E! Online's "Studio Boss" at upwards of 500,000 and growing between 25 percent and 50 percent annually. Indeed, an analysis of the most popular service, the Hollywood Stock Exchange (HSX), suggests a surprisingly strong commercial opportunity in this arena.

The HSX boasts 60,000 registered users and is growing at 1 percent to 2 percent daily. Company officials say 10 percent of the HSX's users are active traders who visit the site an average of once a day to buy and sell "stocks" and "options" in stars, movies, scripts, etc.

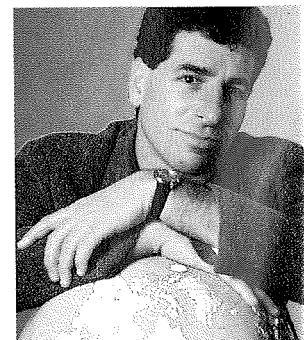
What's more, the current trading volume on the HSX is 50 million shares daily—more than the American Stock Exchange! And the face value of the fiat securities traded each day is more than \$2 billion. Not too shabby.

Indeed, the success of fantasy-game stock markets would seem to validate the notion that there is broad public interest (among Internet users, at least) in investing in entertainment.

Even though such entertainment-oriented investing is still just a fantasy, the eager groom is lustily eyeing the prospective bride's luscious new market and heaving revenue potential.

So don't be surprised if this pair moves beyond the flirtation stage to a marriage that will produce a new Internet market in entertainment-based securities. ■

Our craving for entertainment knows no bounds and creates new markets.



David Kline (dkline@well.com) is an author, business consultant and commentator for "Marketplace" on National Public Radio. His book, *Road Warriors: Dreams and Nightmares Along the Information Highway* (Plume, 1996), co-written with Daniel Burstein, is available in paperback.

HIGH ROLLER:

Bill Davidow, Mohr, Davidow Ventures

By Jim Evans

Most venture capitalists think they've reached the top of their profession when they no longer have to go out and hustle deals. In fact, many VCs want to get to the point where they're so well-known that the deals come to them ... in droves.

Not Bill Davidow. While Davidow has no particular aversion to pitches by the bushel, his instincts tell him the best deals are the ones he goes out and finds.

"I don't know if the best things always find you," says Davidow.

One of the top Silicon Valley VCs, Davidow stands out even among the elite. He belongs to a rare class of VCs that has operational experience, marketing knowledge and high-level contacts. And Davidow is not afraid to get his hands dirty fine-tuning a company's strategy or its organization.

Before joining the firm, he held several positions at Intel Corp., including senior vice president of marketing and sales, and vice president of the microcomputer systems division. Davidow says the Intel experience has been vital to his success.

At Intel, "I learned a lot about how to achieve results and how to make an organization run," he says. "What I've been able to help our companies with [regarding] 'operational problems' is because of what I learned at Intel."

Davidow's partners attest that he brings more to the table than just a check. His hands-on approach to operational problems and his contacts make him special in the VC community, says Geoff Tate, president and CEO of Rambus Inc., which licenses memory chip interface technology. Rambus, in fact, is Davidow's latest, well-chronicled investment story. The company had one of the most suc-

cessful IPOs of 1997, when it opened at \$23.75 a share, up from its expected IPO price of \$12. It closed its first day of trading at \$30.25 (as of Jan. 8, Rambus traded at \$54.88).

Tate says that Davidow, who serves as the chairman of Rambus, has been crucial to the success of the Mountain View, Calif.-based company.



"Our model requires a different way of thinking ... but Bill can grasp a different concept," says Rambus' Geoff Tate.

"We had our bad times, and he and the rest of the board were patient," Tate says. "They didn't beat us up every time we had a problem—and they have millions of dollars [invested] in the company."

Davidow's patience with Rambus was notable, considering that the company has

a business model many investors would call unique. Instead of manufacturing chips as do Intel and Texas Instruments Inc., Rambus designs intellectual property that it licenses to chip companies in return for royalties. For example, many of the major semiconductor companies have licensed Rambus' memory technology.

"Our model requires a different way of thinking ... but Bill can grasp a different concept," Tate says.

It certainly didn't hurt that Davidow also has extensive contacts in the chip industry from his tenure at Intel. One of the keys to executing the Rambus business model is getting in the door to top-level management at the biggest semiconductor companies. It's worth noting that Intel was a significant investor in the company and formally backed its technology last year.

Rambus isn't the only semiconductor-related company in which Mohr, Davidow Ventures has invested. The firm also had a hand in Actel Corp., Chromatic Research Inc., S3 Inc. and PMC-Sierra Inc. (formerly Sierra Semiconductor Inc.), among others. Of his recent investments, Davidow is particularly high on Form Factor Inc., a chip packaging company based in Livermore, Calif.

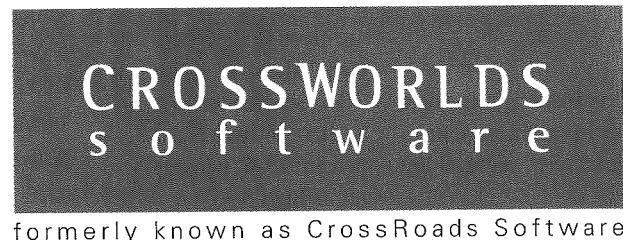
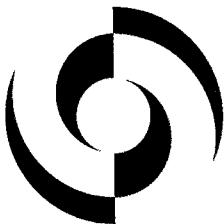
While Davidow's semiconductor experience is crucial in the venture firm's success, Mohr, Davidow isn't limited to investing in chips. It also has invested in Internet companies such as PointCast Inc. and enterprise software companies such as Vantive Corp.

Davidow says that when it comes down to it, the most important function of a VC is to open doors.

"Most startups are management deficient," Davidow says. "I tell them to find a VC who can be part of their management team to make up those deficiencies." ■

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December 1997



CrossWorlds Software, Inc.

**\$25,000,000
Series D Preferred Stock**

Corporate Investors:
**Compaq, JD Edwards, Kanematsu,
Manugistics, Omron**

Financial Investors:
**Attractor, Deutsche Morgan Grenfell,
Galleon, J. & W. Seligman,
Levensohn Capital Management**

The undersigned acted as financial advisor to
CrossWorlds Software, Inc., assisted in the negotiation
and arranged the global private placement of shares.

**Deutsche Morgan Grenfell
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Picks of the Pros

Christine Chien
Scudder Kemper Investments
Chicago
www.kemper.com

Christine Chien, a technology analyst with Scudder Kemper Investments, bristles at questions about "safe" technology stock picks.

"A 'safe' technology stock pick is an oxymoron," Chien says. Investors looking for less risky technology picks should look into computer service companies, she advises. She is, however, interested in semiconductors. Scudder Kemper Investments class C (KTCCX) invests in companies that benefit from technological advances. It invests primarily in common stocks. *Investor's Business Daily* gave KTCCX a "B" grade as of Jan. 2, 1998. This means KTCCX's gains and dividends put it in the top 25 percent of all mutual funds for the past 36 months.

While chip investment is risky, Chien says there are good opportunities in the sector, as she feels that most of the mar-

ket damage has been done. "Chip stocks are close to their bottom," she says. "The SOX [Semiconductor Sector Index] is 30 percent to 40 percent off its high."

When making judgments about specific companies, she looks at everything from financial fundamentals to strategic alliances and management. She cites Intel Corp. as an example of a chip company with an especially deep management team. "The technology moves so quickly that you need good management to make quick decisions," she says.

In terms of general market trends in 1998, Chien says the way she views the markets has less to do with technology and more to do with global market characteristics. "The world economy will always drive the chip market," she says.

While many in the chip business were saying global sales would reach \$300 billion

Intel Corp.

Headquarters: Santa Clara, Calif.
Exchange/Ticker: Nasdaq: INTC
Closing Price (12/31/97): \$70.87
P/E (last 12 months): 17.9*
EPS (last 12 months): \$3.95*
Revenue (last 12 months): \$25 billion
Net Income (last 12 months): \$7.1 billion

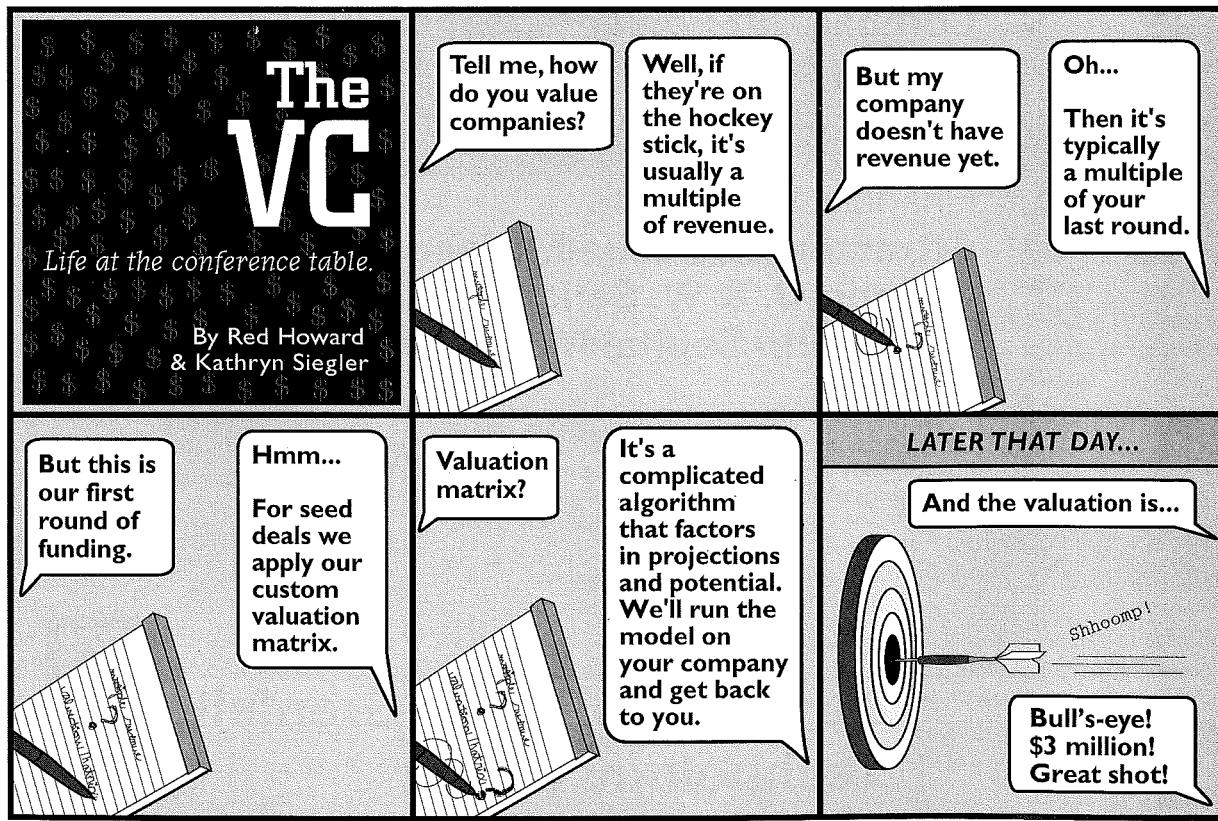
*Numbers as of Jan. 2, 1998

Scudder Kemper Investments, Class C

Top Holdings (as of 1/2/98):
 IBM Corp., NYSE: IBM
 Intel Corp., Nasdaq: INTC
 Cisco Systems Inc., Nasdaq: CSCO
 Hewlett-Packard Co., NYSE: HWP

in 2000 (the Semiconductor Industry Association says forecast sales were about \$138 billion in 1997), Chien believes market problems will be a drag on chip sales. "[Three-hundred billion dollars] is optimistic, especially with the problems in the Far East financial markets," she says. "And many people think the U.S. economy will slow as well."

Chien cautions that in 1998 chip investors shouldn't look for a return to the halcyon days of 1995, when the industry grew 47.1 percent to \$144.4 billion in sales. "It's going to be another rocky year because there are more uncertainties," she predicts.—Jim Evans



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December 11, 1997

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Nonprofit Parents, Corporate Kids

It's no exaggeration to say that most of the Internet industry looks on the educational, governmental nonprofit origins of the Net as a historically important but largely spent force—irrelevant to what happens next. More enlightened business planners and investment analysts concede that the Internet Society (ISOC), the Internet Engineering Task Force (IETF) and the Web consortium (W3C) are growing concerns when it comes to protocol development and public policy. But if you're a Web developer, an Internet service provider or an investor, you're a child of the "old" nonprofit Internet. Looking ahead, chances are you're far more concerned

about Microsoft, Sun, IBM and Netscape's visions of the future than you are about the leaders of academic networking and the bureaucrats at the National Science Foundation (NSF). After all, it's not their Internet anymore, is it?

Actually, there's a great deal of life left in the Internet's nonprofit parents. And although they're proud of the accomplishments of their offspring, they've decided to have more children.

David Lytel

(david@lytel.com) served in the White House Office of Science and Technology Policy during President Clinton's first term. He runs Sherpa Consulting Group, an online business development agency, and teaches in the culture, communications and technology program at Georgetown University.



Internet by the Numbers

The university community has been grumbling since 1995 that its contracts with commercial ISPs were not getting it the advanced network infrastructure it needs. It's true this coincides with the

end of the NSFNet program that put \$200 million into networking for the research and education communities between 1986 and 1995. This leads some to interpret the grousing as a predictable reaction from an interest group that lost its taxpayer subsidy. But remember that the 100-plus major research universities spent hundreds of millions of dollars on networking over that same period. The NSF money helped to organize this investment, but it was universities—not taxpayers—who shouldered the overwhelming part of the burden of building today's Internet.

As a consequence of this dissatisfaction, a movement arose last year to plan what is now being called Internet2, which would provide end-to-end connectivity at the gigabit-per-second level to academics and researchers. At first this only involved a couple of dozen universities acting on their own. Then, in the spring of 1996 the NSF conducted an internal review of the vBNS (very high speed backbone service) that connects the nation's supercomputer facilities. The review determined that it wasn't cost-effective to continue to dedicate the network solely to this mission. So in the summer of 1996 the NSF began to open up the vBNS to academics who were working on either advanced networking or bandwidth-intensive applications.

More recently, the NSF decided upon about 90 grants of \$375,000, matched at least 50 percent each by the participating institutions, to connect to the vBNS. This is NSF's part of the U.S. government's response to Internet2, the Next Generation Internet (NGI) initiative,

which includes government support for research into enabling technologies and application development.

Last October, the universities organized the University Consortium for Advanced Internet Development (UCAID) to administer Internet2. It is as

close as we've gotten in this country—so far—to a permanent entity that speaks for the academic networking community. The presidents of the universities of Pennsylvania, Wisconsin, Southern California and North Carolina have signed up to be on its board.

The next-generation Internet is the offspring of diverse parents.

Uncle Sam as Midwife

Once again, as they did in the mid-'80s, the universities are organizing their buying power, mixing in government support and making it possible for networking companies to meet higher education's special needs—while enabling research in high-performance networking. More than two dozen companies, such as Newbridge and Time Warner—eager to pioneer and test new enabling technologies—are providing cash and in-kind contributions so the products emanating from this research can be commercialized as rapidly as possible.

There is a lot of life left in the cooperative model that built today's Internet. As with the original Internet, the goal of Internet2 and the NGI is to develop and then transfer the technologies and standards to the commercial world. Internet2 will be operational in places such as New York, Virginia and North Carolina this year. And even though today they're not more than a gleam in their parent's eyes, Internet3, 4 and 5 are likely to be born the same way. ■

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May 14, 1997



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Why Pilots Wear Clip-On Ties

By S.B. Canyon

We already know that drinking and driving don't mix. Some passengers need to learn that drinking and flying aren't such a good idea, either.

Once when I was a 767 co-pilot, we had a huge guy in coach who was seriously sloshed. He wasn't content to just be drunk. He also wanted to kill everybody onboard—or so he told the flight attendant who asked him to hold down the noise.

My co-captain decided it would be a good idea to talk with the guy. He came back a few minutes later with a concerned look on his face. "Yep, he wants to kill everybody all right. As a matter of fact, he told me that he wants me dead, too."

"Uh, Tom ... what happened to your tie, dude?" I asked, noticing his open collar and missing neckwear.

"As I was leaning over to talk with this idiot, he grabbed my tie and tried to coldcock me. The tie came off, and I decided it was time to get back to the cockpit. Let's divert and get this guy off the plane."

We declared an emergency and scurried to land—three hours short of our destination. It took three cops 10 minutes to get the drunk off the jet.

Feds to Drunks: Get Off!

Federal regulation states that airline employees are prohibited from allowing an intoxicated person to get on a plane and from letting anybody get drunk once they're aboard. This follows the same logic as drive-up beer windows at service stations and convenience stores.

A drunk can be the most dangerous

thing to have on an airliner. An angry drunk is even worse. That's why you may notice that airline people always try to keep drunks happy, at least until we think they won't take a swing at us. Then we cut them off.

If there is a drunk in the back with you, don't be surprised if no pilot shows up to confront him or her. Most airliners are flown by a two-pilot crew. If one becomes



BRIAN RASZKA

incapacitated in a bar brawl with a passenger, Houston, we've got a problem.

Simple Pleasures

One of the fun things about being a captain is having these dangerous types arrested. A couple of years ago, three guys in the front of my DC-9 were running all over the jet, whooping it up. They were grabbing passengers in personal places and didn't even sit for the landing. When we landed, six state troopers met the flight.

"What can I do for you, captain?" an especially large trooper with a crew cut asked me.

"I want these three [yes, they were stupid enough to be in the front of the

line] on their faces, on the ramp, cuffed and stuffed."

Believe it or not, the troopers did just that. As the rest of the passengers disembarked, they got to walk past these clowns, now on their faces on a wet ramp, having their rights read to them. Sometimes nothing tops the satisfaction of being captain.

OK, you're asking, but what about drunk pilots?

"Under the Weather"

In the "good old days" about 20 years ago, pilots used to cover for each other. Nobody ever knowingly flew with a drunk guy, but if your partner had partied the night before and was still "under the weather," you might fly for him until he felt better or got off at the next landing after calling in sick.

Today, we don't play that game. If there's any sign that a crew member has been drinking, we don't take the flight. It would cost us our careers to do otherwise. If a passenger kids around and says something like, "Hey, didn't I see you guys close the bar last night?" we immediately cancel the flight and go in for an alcohol test.

So next time you travel, check out your pilot's tie. I bet it's a clip-on, but not because he or she is a lazy dresser with no fashion sense. We don't get combat pay, but it can be a jungle back there. ■

When he's not wrestling with drunken passengers, S.B. Canyon can be found piloting planes for a major airline. Send him your executive travel gripes at planetruth@upside.com.



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Just Our Bill?

By Stevan Alberty

Microsoft bashing" has long been a popular leisure-time activity among its competitors, although the tone has usually been more envious than vicious. Companies depending on Microsoft for its patriarchal largesse through alliances or distribution agreements can be somewhat begrudging, as if Microsoft were a rich relative with gluttonous table manners who has to be invited to Christmas dinner but next to whom no one wishes to sit. Even Microsoft's customers, the millions for whom the morning Windows startup chime peals like a call to Mass, love to take an occasional whack at Bill and his billions.

The public's use of that first name to refer to the founder and chairman of the Big M is instructive. We never called Iacocca "Lee." For a long while, Bill seemed to be "one of us"—a lucky stiff who just happened to be in the right place at the right time and struck it rich. We see him in mythic terms, his rise to success being a classic example of what Joseph Campbell called "the Hero's Journey." Any messy realities that interfere with that myth are neatly ignored. Despite his parents' comfortable wealth and social standing in Seattle, we tend to think of Bill's background as vaguely commonplace. He "dropped out of college," we tell ourselves, "so if Bill can make it ..." We forget that the college was Harvard—and he didn't leave because of poor academic performance; he left to start his own company.

Lately, there has been a subtle metamorphosis in the Bill Gates myth. What once looked like a classic Hero's Journey is undergoing a little shape-shifting. Yet little in Gates' recent personal or professional behavior indicates that he is at all aware that Microsoft may occasionally get carried away in the pursuit of what it sees as its manifest destiny.

The ancient Greeks were amazingly tolerant of their heroes. Nobody minded much if they amassed personal wealth by pillaging entire cities, or if they killed off a few competitors, including members of their immediate family. But the Greeks drew the line at "hybris" (what we today call "hubris"), an excessive arrogance which always

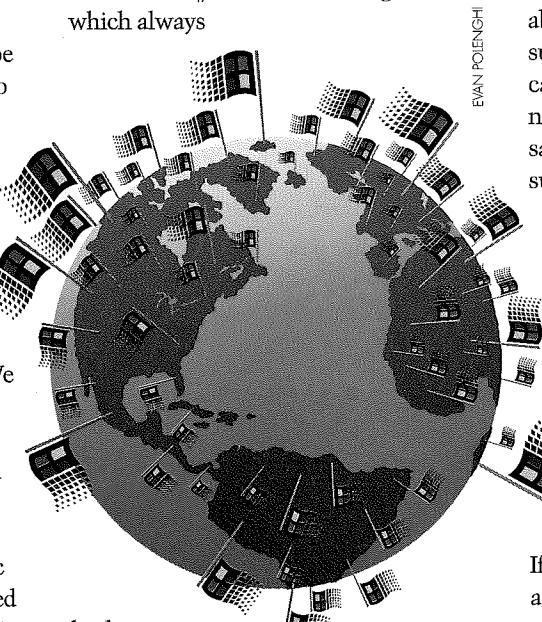
lion. But in Seattle, visitors to the art museum pay \$6 to see da Vinci's *Codex*, on loan from the private collection of Bill and Melinda Gates. This last instance of philanthropy seems less noble than regal: Let them browse cake.

Brian Arthur, an economist at the Santa Fe Institute, attributes Microsoft's ability to enter, dominate and potentially suffocate multiple markets to a theory he calls "increasing returns." Gain dominance in one technology market—let's say PC operating systems—and consumers will buy your other products based not just on their quality, but on their presumed inevitability. It is this circular, self-nourishing loop of perceptual advantage which concerns not only economist Arthur, but now the Department of Justice.

What should concern Bill is that "increasing returns" work both ways. Small shifts in public perception can feed upon each other and cascade out of control.

If Gates doesn't muzzle his company's aggressive behavior and learn to play well with others, it may not be long before America begins to transform the Bill Gates myth into something far less flattering. No longer the smart (if overly acquisitive) innovator, Gates may ultimately become viewed as just plain mean. That doesn't make him a hero, it makes him the Leona Helmsley of technology.

"A lawyer once told me that Leona Helmsley got put in jail because she paid 2% less income tax than what she owed," says Arthur. "So she didn't go to jail for income tax, she went to jail for arrogance, for saying 'only the little people pay their taxes.' That's what's going to screw Gates." ■



leads to some form of retribution.

Americans also like a little humility in their heroes. We want to see small-town boys make good until their britches get too big for them. (In Hollywood, this is referred to as the "David Caruso Law.")

Microsoft has cornered the market in PC operating systems and applications, and invests in everything from cable and telecom networks to movie studios to Internet postage to voice recognition. To paraphrase Will Rogers, Gates seems never to have met a market he didn't like. But new disclosures exposing the darker side of Microsoft's persona now appear with disturbing frequency.

Meanwhile, at the United Nations, Ted Turner donates a billion dollars. In Russia, George Soros hands out half a bil-

Stevan Alberty (alberty@earthlink.net) is a freelance writer and the former director of technology for Chiat/Day Advertising.

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No Tsunami Yet

By David James

Here in Tokyo, the cybercafés are humming. At Cyber Net Café in the Harajuku district, high school students pay \$3.25 for a Coke and \$4 for 30 minutes of surfing. At Surfscape Tokyo, in central Tokyo, young businesspeople pay \$17 for several hours of unlimited Net access.

There are plenty of Japanese-language Web sites, but English-language sites, especially American ones, are also popular because most Japanese are accomplished in English. Japanese students study English for at least six years, and corruptions of English words continue to creep into spoken Japanese. There's no shortage of surfers to "daburu-kurikku" (double-click) on an "ai-kon" (icon) with a "mausu" (mouse).

You'd think the Japanese—renowned for embracing new technology with gusto—would be flocking to the Internet. Their use of cellular phones jumped 81 percent from 1991 to 1996, compared with a U.S. increase of 42 percent.

But those with high expectations for Internet adoption in Japan have been disappointed, including many in the PC business who assumed that Internet usage would drive PC sales here. Third-quarter 1997 PC sales in Japan dropped 12 percent from third-quarter 1996, compared with a rise of 20 percent in the U.S. and 16 percent worldwide. "Anemic Internet usage is one of the reasons for weak PC sales in Japan," says Kevin Hause, an analyst with International Data Corp. of Framingham, Mass.

The major culprit, according to Hause and others, is the high cost of telecommunications. Nippon Telegraph and Telephone Corp. (NTT), Japan's largest domestic telephone service company,

charges about 9 cents for every three minutes of local calls, on top of the \$14.50 basic monthly service charge. A personal dial-up account with an Internet service provider (ISP) costs an additional \$25 per month. A 64Kbps ISDN leased line costs a minimum of \$700 for installation and \$600 per month—and getting it will take at least three weeks.

up Web sites with out-of-date material and little information. In addition, says Duley, many Japanese companies burden their Web sites with slow-loading graphics, causing surfers to stay away.

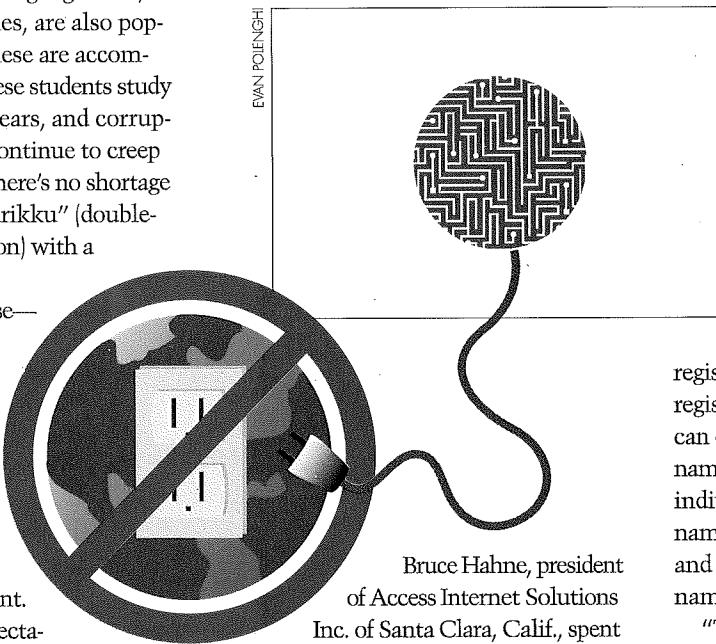
For Internet Access Center, a large Japanese Web developer and ISP, overregulation is a major part of the Internet development problem. According to

Bradley Bartz, IAC's president, the Japan Network Information Center (JPNIC), Japan's equivalent of InterNIC (the body governing Internet domains), is stifling Net development with restrictive rules on registering domain names. For example, JPNIC has decided that a single company or entity cannot register more than one domain name, and a foreign company cannot register a domain name unless it has a registered office in Japan. An individual can only register a geographic domain name (which is often lengthy). A foreign individual can only register a domain name if he or she has a Japanese visa and is living in Japan. And domain names cannot be bought, sold or traded.

"This is restraint of trade, and it's hurting anyone who wants to do business on the Internet in Japan," Bartz says.

Along with Web use, e-commerce is also lagging in Japan. "One reason is that the Japanese don't like to use credit cards much," says Larry Smith, a director at the East-West Center in Honolulu. In addition, according to Roger Boisvert, president of Global OnLine, one of Japan's largest ISPs, Japanese banks and government officials are still wrestling with encryption standards.

Perhaps a more fundamental impediment to Internet development in Japan is the country's culture. Promoting oneself with a personal Web page or sending a casual e-mail message is culturally



Bruce Hahne, president of Access Internet Solutions Inc. of Santa Clara, Calif., spent

the past four years in Japan helping develop its Internet industry. He blames NTT and the Japanese government for the pricing problem. "Domestically, NTT pretty much has a lock on local-loop circuits, plus they own almost all the relevant national infrastructure, plus the government doesn't seem particularly intent on forcing pricing sanity into the monopoly," he says.

And then there are the problems of content—or, more precisely, the lack of content—not to mention poor Web site design. According to John Duley, president of Cyber Technologies International K.K. in Tokyo, many companies and government ministries are putting

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<p>November 1997 \$180,000,000  Initial Public Offering LEHMAN BROTHERS</p>	<p>October 1997 \$132,200,000  SPEEDFAM INTERNATIONAL, INC. Common Stock LEHMAN BROTHERS</p>	<p>August 1997 \$98,900,000  SPECTRIAN Common Stock LEHMAN BROTHERS</p>	<p>July 1997 \$901,500,000  GALILEO INTERNATIONAL Initial Public Offering LEHMAN BROTHERS</p>
<p>July 1997 \$105,100,000  NICE SYSTEMS Ltd. American Depository Shares LEHMAN BROTHERS</p>	<p>June 1997 \$96,500,000  ASE TEST LIMITED Common Stock LEHMAN BROTHERS</p>	<p>June 1997 \$52,000,000  GENESYS Initial Public Offering LEHMAN BROTHERS</p>	<p>May 1997 \$1,140,000,000  Amphenol Senior Secured Credit Facilities and Senior Subordinated Notes LEHMAN BROTHERS</p>
<p>May 1997 \$75,000,000  Gilat Convertible Debentures LEHMAN BROTHERS</p>	<p>April 1997 \$660,000,000  QUALCOMM INCORPORATED Trust Convertible Preferred LEHMAN BROTHERS</p>	<p>February 1997 \$158,000,000  IONA Technologies Initial Public Offering (ADSs) LEHMAN BROTHERS</p>	<p>January 1997 \$230,000,000  adaptec Convertible Subordinated Notes LEHMAN BROTHERS</p>

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uncomfortable. This is a collective society in which standing out from the crowd is discouraged, and humility, formality and polite behavior are essential.

According to Fumiko Halloran, a well-known Japanese author, personal correspondence should be handwritten to show respect and courtesy. She notes that when older Japanese use a word processor in business correspondence, the writer will often apologize at the end with, "Please excuse me for writing this way." Regarding the low quality of Web content, Halloran comments that "real" information in Japan is exchanged only in face-to-face

confidential talks, with no record-keeping (one reason Japanese politicians seldom produce good memoirs).

In communications generally, Japan is a "high context" society; it's assumed that the listener (or reader) understands much from the context of the communication. It is not necessary to be as explicit as it is in English-speaking societies. (There is a Japanese proverb: "Say one, understand 10.") And virtually all valuable relationships, especially in business, are based on personal contacts and consensus-building.

So it's no wonder that Internet and

Web use is slow to develop here. Nonetheless, there is a huge market for the Internet because of Japan's large population (125 million) and its enormous technology-based industrial economy. There are today about 800 active ISPs in Japan, and the number is growing. Moreover, according to International Data Communications of Tokyo (www.idc.co.jp), Japan's telecoms are getting into the act by offering competitive Internet services.

Nikkei Market Access, a market research company affiliated with Nikkei Business Publications Inc., estimates that there are more than 7 million Internet users in Japan (second only to the United States), a number International Data Corp. believes will swell to 32 million in 2000. And according to Dentsu Inc., Japanese advertisers spent \$32.8 million on the Internet in 1997, a 250 percent increase over 1996.

Global OnLine's Boisvert believes Internet use is growing quickly among Japanese in their 20s and 30s. He agrees that NTT's connection charges are too high, but notes that there's good news, too: "NTT is investing heavily in fiber-optic and ISDN connections throughout the country. Japan's Net is going to be one of the best in the world."

As an ISP, Global OnLine is carving out a niche for itself based on something the Japanese value greatly: high-quality service. This means wide bandwidth, dependable connectivity and voice support in Japanese and English.

"(Japanese) companies are now realizing that they have a unique opportunity to use the Web for more than just a brochure, and they are beginning to put up strong, useful content," says Cyber Technologies' Duley.

The Japanese, it should be noted, are not slow learners. They like to test the waters deliberately and thoroughly, but when they decide they want or need something, they plunge in with abandon.

The present slack tide for the Internet in Japan may obscure a huge tsunami that is on the way. ■

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<p>\$32,200,000  MAS American Depository Shares June 1997</p>	<p>We acted as exclusive financial advisor to management in its acquisition from Sega Enterprises, Ltd. and participated as an investor.  SEGA GAMING TECHNOLOGY LTD. June 1997</p>	<p>\$41,910,600  RF MICRO-DEVICES Common Stock June 1997</p>	<p>\$300,000,000  InterCel 11 1/4% Senior Notes due 2007 June 1997</p>
<p>\$82,524,000  teledata IDG Ordinary Shares May 1997</p>	<p>\$75,000,000  GILAT 6 1/2% Convertible Subordinated Notes due 2004 May 1997</p>	<p>\$20,700,000  Peregrine SYSTEMS Common Stock April 1997</p>	<p>\$22,425,000  DATUM INC Common Stock March 1997</p>
<p>\$54,450,000  DIGITAL MICROWAVE CORPORATION Common Stock March 1997</p>	<p>\$64,307,660  ANADIGICS Common Stock February 1997</p>	<p> GENERAL PHYSICS CORPORATION has been acquired by National Patent Development Corporation January 1997</p>	<p>\$72,737,500  REMEC Common Stock January 1997</p>

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COVER STORY



NETSCAPE'S MARC ANDREESSEN

INTERVIEW BY RICHARD L. BRANDT

Netscape Communications Corp. was beginning to look like a real contender against Microsoft Corp. at the end of 1997. Its revenues and earnings had grown rapidly all year, and the Department of Justice appeared on the verge of reining in Netscape's biggest foe. Then the Web pioneer announced its first-ever earnings decline and operating loss. What's going on? Can it make a comeback? We talked to Marc Andreessen—Netscape co-founder, executive vice president of products and main technology visionary—to find out.

UPSIDE: What happened in the fourth quarter [1997]?

ANDREESSEN: Browser revenue declined faster than we thought, and enterprise sales and service grew slower than we thought, and the Web sector grew slower than we thought. So what we have on our hands is a series of execution challenges.

That happened just as it began to look as though Microsoft could be reined in and hobbled a little by the Department of Justice, providing new opportunities for Netscape. Now we have to ask: What kind of shape is Netscape in? Netscape's in as good or better shape than we've ever

been in, and the reason is interesting. Our business consists of three pieces: There's the stand-alone client or browser business, the enterprise software and services business, and now there's this new Web site business.

The interesting thing is that the browser portion of the business has declined to about 13 percent of revenue, from about half just a year ago. The enterprise business is up 70 percent year over year, the Web site business is up 100 percent plus. Now we will be taking the price of the Navigator and Communicator products to zero. We're going to use a free browser with massive distribution, and use that as a

seeding strategy for both the enterprise business and the Web site business.

Over the past year, Netscape has emphasized that its future lies with the enterprise side of the business. There's some justification for saying that switch is because Microsoft is eating up Netscape's browser business. No shit, Sherlock!

But enterprise software is essentially a client-server model, and the browser is the client. So how important is the browser to your enterprise model? You're right. It's a bundled client-server model. In fact, now it's clients, servers, applications, tools and services.

Even though our sales in Q4 were lower than we had expected, we did \$90+ million worth of enterprise deals in Q4. Most of those deals are done on a per-seat basis, including both clients and servers.

It's interesting: You can shift the money around. If you want to call the client \$20 a seat and the servers \$20 a seat, it's actually the same thing as calling the client \$0 a seat and the server \$40 a seat. It doesn't matter, right?

The point is, you're doing these deals with these businesses that are starting to do fundamental, important things with this technology: to build their businesses online, to build extranets, to build intranets and so on. They are amenable to paying on a per-seat basis for this whole suite of what they need.

surance company in Europe got all lined up to buy a large enterprise site license from us, and at the last minute the CIO gets this internal political opposition, which goes along the lines of: "How can you be doing this when Microsoft is going to be giving away its browsers for free? How can you be paying for it?" Now that CIO can go back to his internal political opponents and say, "We're getting it for free from Netscape also, so it doesn't matter." Or if he wants to he can say, "We're also going to use the Microsoft client." So it becomes a nonissue in the buying decision.

Do you think that this will reverse the market-share gains that Microsoft has been making in the browser market? It will make it

also below the surface in terms of intimidation.

Are PC makers talking to you again? Yes.

What's their position? Are they waiting for final moves from the DoJ or will you be announcing some bundling deals yourself?

We're optimistic about that. What we've got from several of them now is that they're willing to do it as long as others are willing to stand up next to them.

So you need one to start the way? Well, we need to get two or three or four at once. That's what we're working on right now.

It's been funny watching the behavior of the PC OEMs in public during all of



But what about the gains that Microsoft has been making in the client side, the browser side? Doesn't that weaken your position? It has always been the case that our server software and our application software have been client-neutral. Any client can support the standards that our servers and applications support. If you want to use someone else's client software, whether it's Microsoft's client or Lotus' client or whatever, you can, as long as it supports the industry standards.

If the customer is using your browser, though, doesn't that help you sell the rest of the seat?

One of the points of taking the stand-alone price of the client software to zero is to remove that from consideration in the buying decision. For example, a large in-

much easier to compete with Microsoft's distribution strategies. There are two things Microsoft's been doing on the client side. One is free, and the second is bundled. Free we're equalizing now. Bundled is what the DoJ is going after. It's going to be an interesting test of the true effects of the DoJ's recent activity and the activity of the Courts, because if we can go in now and get these bundling deals that previously had been blocked off from us, then the DoJ will be successful. And if we can't go get those, then it'll turn out that the DoJ actually hadn't been successful. So we're going to go after them hard.

Obviously Microsoft employs a broad range of tactics, both above the surface in terms of pricing and contracts, and

this. There was that initial surge of people under subpoena giving quotes to the *Wall Street Journal* about how much Microsoft is intimidating them. Then, ever since they've all been like, "Oh no, everything's fine, we want Microsoft." Microsoft absolutely has a gun to their heads.

Microsoft has gone after the browser business vehemently, which indicates the importance of this market to the entire business that you are going after. They're pretty worked up over it.

You seem to be saying, though, that since you can work with whatever browsers they have out there, that you can operate fine. So do you think that the browser is less important than Microsoft does? No. Not at all. Let's

step back and look at this in cosmic terms. The best thing to happen to Microsoft or to Microsoft's customers in the last two or three years has been the emergence of Netscape, because it's forced Microsoft to start going after innovations in the software space. Things were starting to stall around the time Windows 95 came out. They were running out of things to copy.

We forced Microsoft to continue innovating and actually pay attention to what the customers want. If we hadn't come along, Microsoft wouldn't be doing any of this client software to support any of these [Internet] standards. Instead of HTML you'd have Blackbird. Instead of IMAP you'd have MAPI. Instead of MIME you'd have Microsoft proprietary messaging formats

plaint against Microsoft] should be disqualified for selling his soul to the devil? Well, if he sold his soul to the devil, then [Microsoft] should be completely happy with him!

Do you think he should be disqualified for saying he felt like he "sold [his] soul" by installing Internet Explorer? I have no idea. I have no clue.

Can Java Kill Microsoft?

Netscape and Sun both seem to be betting on Java becoming a standard to help battle Microsoft. How real is Java's promise of "write once, run anywhere"? It has to be looked at in a historical context. Fortran came along in the early '50s. The promise of Fortran was, guess what? Write once, run anywhere. For structured languages

Law covered up [that problem] again. The programmers got productivity gains.

So now we're at the next logical step, which is: Is Moore's Law going to be moving fast enough over the next few years to allow another intermediate layer to be put in place which isolates programmers from the [chip]?

Java is already succeeding as a language. So it's just a matter of how quickly the Java byte code interpreters get fast enough and stable enough and compatible enough to be run at an acceptable level of performance, and how quickly Moore's Law is moving to cover up whatever gets slowed down.

There are two assumptions here. The first is that, in order for there to be enough productivity gain for the programmers, there would have to be enough platforms out there that they'd want to write to. True.

The second is that these compilers have to get fast enough to make the program run efficiently on a lot of different chips. In the past, you used C++ to write a program for just one microprocessor. There's a big difference when you're talking about compiling it to a lot of different microprocessors, each with its own instruction set. You have to look at the quality of each just-in-time compiler. Every chip vendor, from Intel on down, is working on advanced just-in-time compilers for their own chip architectures. It'll end up being a point of differentiation for chip vendors as to who has the best just-in-time compilers. This is a ways off, but at that point you have the best of all worlds. The programmers write once in Java, and then on each individual chip—the just-in-time compilers do a better job of compiling down to machine code than the programmers could. That's the art of this. The Java compilers are not quite there yet.

How long will it take them to get there?

I don't know. They've come a long way just in the last 12 months. For a lot of applications they're within a factor of two to three now. They should be getting close to parity over the next year or two.

When that happens, do operating systems become less important? Operating systems start to revert to their original role, which



and all these other things, right?

So if Microsoft supplies standards-compliant clients, that's great. It's great for us, because our servers will work with them. In order to force them to continue doing that, there needs to be competition. We need to [offer] the client software at the very least, so they're forced to continue to do that. Now on top of that, we think we'll hold or grow share because both products are going to be free and both are going to be doing all kinds of bundling things. This could easily turn into a Coke and Pepsi kind of thing, because it's going to be an issue of consumer preference. Frankly a lot of people today are using both.

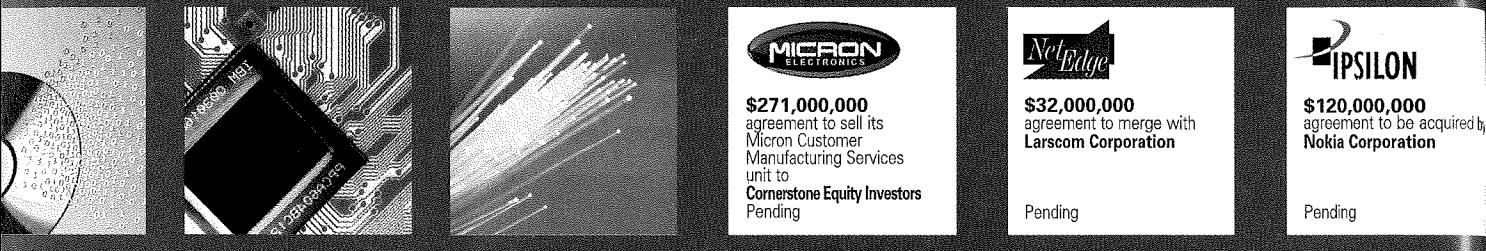
Do you think Lawrence Lessig [the "special master" appointed to oversee the DoJ com-

like Fortran and Cobol and C, what they said was, "You write it once in source code, you compile it onto an individual chip." The argument against that at the time was, "You can get faster performance if you hand-code in machine code [which the microprocessor understands without the extra step of 'interpreting']." Nevertheless, structured languages took off, because it turned out they provided programming productivity. Moore's Law was moving fast enough to cover the performance gap.

The same thing happened when object-oriented languages emerged in the late '70s and early '80s. The original argument against C++ was that it forces software to go through more intermediate layers and it cuts down on performance. Object-oriented languages took off because Moore's

continued on page 112

Changing the in technology



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MICRON ELECTRONICS
\$271,000,000
 agreement to sell its
 Micron Customer
 Manufacturing Services
 unit to
Cornerstone Equity Investors
 Pending

NetEdge
\$32,000,000
 agreement to merge with
Larscom Corporation
 Pending

IPSILON
\$120,000,000
 agreement to be acquired by
Nokia Corporation
 Pending

Lucent Technologies
\$300,000,000
 sale of
 Advanced Technology Systems
 business to
General Dynamics Corporation
 October 1997

Lucent Technologies
\$1,800,000,000
 acquisition of
Octel Communications Corp.
 September 1997

VLSI Technology
\$44,000,000
 sale of
 COMPASS Design
 Automation to
Avant! Corporation
 September 1997

GATEWAY2000
\$194,000,000
 acquisition of
Advanced Logic Research, Inc.
 July 1997

ASCEND
\$3,700,000,000
 merger with
Cascade Communications Corp.
 June 1997

VeriFone
\$1,180,000,000
 merger with
Hewlett-Packard Company
 June 1997

Whitetree
\$72,000,000
 sale to
Ascend Communications, Inc.
 April 1997

National Semiconductor
\$100,000,000
 acquisition of
Mediamatics, Inc.
\$550,000,000
 sale of its Fairchild
 Semiconductor division to
Citicorp Venture Capital Ltd.
 March 1997

Apple
\$430,000,000
 acquisition of
NeXT Software, Inc.
 February 1997

Technology M&A



C\$586,000,000
offer to purchase
Broadband Networks Inc.

Pending



\$313,000,000
agreement to be acquired by
SunGard Data Systems Inc.

Pending



\$395,000,000
agreement to merge with
Texas Instruments Incorporated

Pending



agreement to jointly acquire
CompuServe Corporation's
European Online
Services Business

Pending



\$570,000,000
acquisition of
Cyrix Corporation

November 1997



\$125,000,000
sale of
Dagaz Technologies to
Cisco Systems, Inc.

September 1997



\$20,600,000
acquisition of
Innovative Computer
Concepts Inc.

August 1997



\$467,800,000
sale to
Lam Research Corp.

August 1997



sale to
Microsoft Corporation

August 1997



\$43,000,000
acquisition of
Integrity QA Software, Inc.
January 1997
\$929,000,000
merger with
Rational Software Corp.
July 1997



\$155,000,000
sale to
Bay Networks, Inc.

June 1997



has formed a joint venture
involving its Recording Heads
Group with
**Matsushita-Kotobuki
Electronics Industries**
May 1997



\$147,000,000
sale to
i2 Technologies, Inc.

May 1997



\$150,000,000
sale of Dancall Telecom A/S
to
Bosch Telecom GmbH

April 1997



\$1,355,000,000
merger with
Tencor Instruments

April 1997



\$213,000,000
sale to
Cascade Communications Corp.

January 1997



\$228,000,000
sale of its bill payment unit to
CheckFree Corporation

January 1997



\$254,000,000
sale to
3Com Corporation

November 1996



sale to
Lucent Technologies Inc.

October 1996



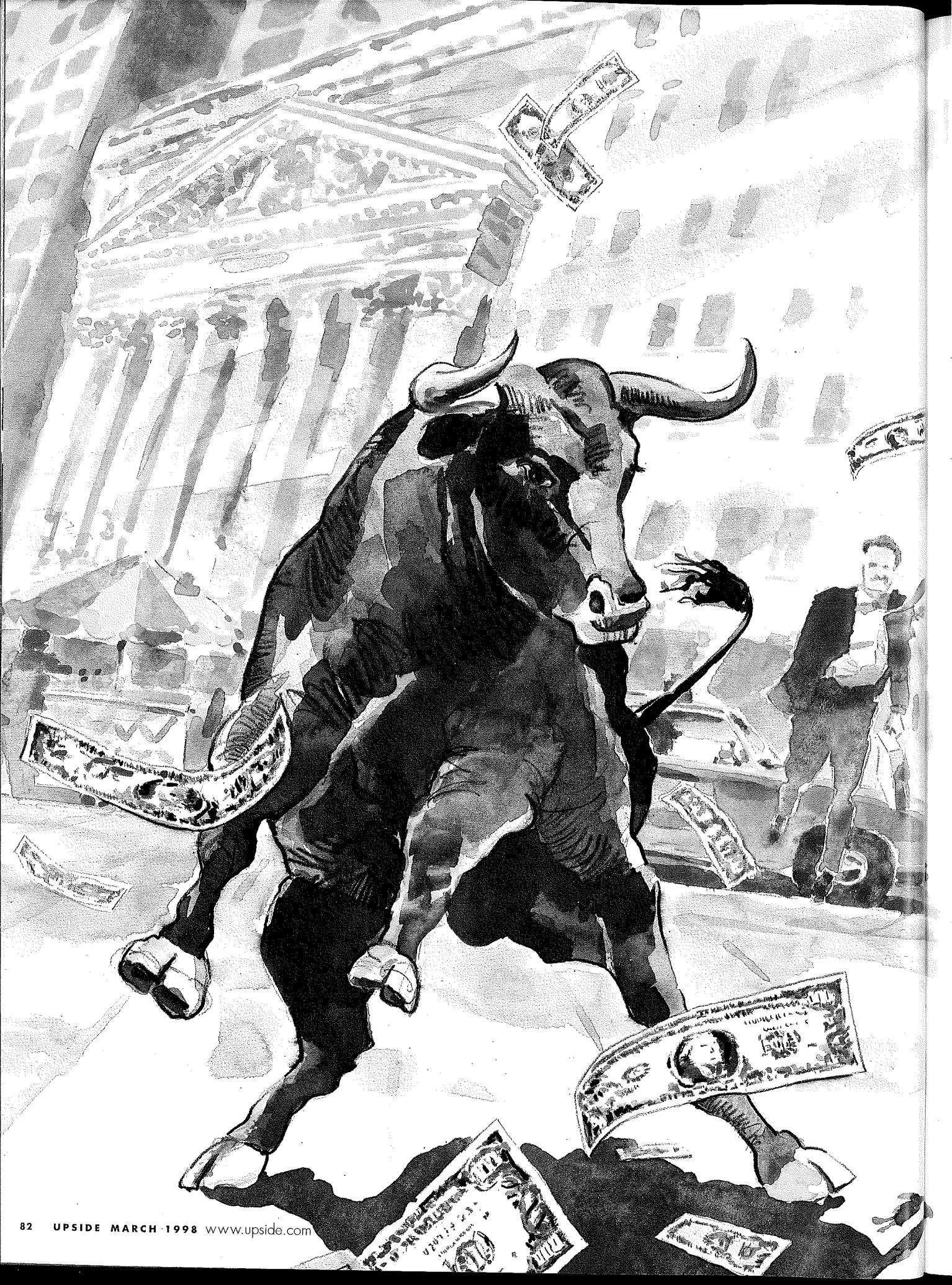
\$225,000,000
acquisition of
Red Pepper Software Corp.

October 1996

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Technology Investment Banking





1997's Bullfight— Bet on the Bear for '98

BY DAVE KANSAS

Wall Streeters lived through several panic periods last year, but they were rewarded with big paydays. This year, the tech sector seems headed for the toilet and Wall Street wealth will likely suffer.

ILLUSTRATION BY RICHARD MERCÁN



For years, strollers venturing into lower Manhattan on a weekend experienced a strange ghost town. The towering buildings, devoid of weekday workers, loomed darkly, and trash blew through the narrow lanes like tumbleweeds. That's all changed. Visitors now cram the streets in front of the New York Stock Exchange on a cold Sunday morning, craning their necks skyward to ogle the citadel of capitalism. During working days, the throng multiplies.

Several years of amazing stock market gains and the accumulation of market wealth by an increasingly broad spectrum of the American populace have made the New York Stock Exchange a destination for visitors. It's now Manhattan's third-busiest tourist attraction. All these common folks milling about at the gates make the investing pros uneasy. For, as the saying goes, once everyone's into the market, who will be left to buy more stocks?

During this period, the so-called technology sector became the market's star. The group has come to embody get-rich-quick dreams. "If I can just get into a Microsoft Corp. or an Intel Corp. early, then I can retire"—at least that's how the thinking goes. In 1997, those wishing for a tech-laden trip to happiness found themselves battered by wicked turns in the market.

Oh sure, the stock market delivered its third consecutive year of double-digit gains in 1997. Investors smiled, traders received fabulous bonuses and hundreds of new companies dove into a growing pool of money. But unlike the smooth climbs of 1995 and 1996, this past year had a dark side. The market was plagued by wild swings, and during a harrowing few days in late October, trading turned vicious. Then the collapsing Asian markets sent Wall Street into turmoil.

By year-end, market soothsayers were seeing bears prowl the Big Board. The easy accumulation of paper gains suddenly seemed over. Technology, once Wall Street's darling investment sector, short-circuited. Without tech leading the charge, could Wall Street pull off another bull run in 1998? Not likely. Savvy investors are tightening their seat belts in anticipation of a turbulent year.

1997's Ups and Downs

Expectations of a continued boom in personal computer use, the emerging Internet

industry and the never-ending need to build networks from Minneapolis to Moscow had the tech-heads dreaming of a long boom that would stretch on deep into the next millennium. Fear? How could one fear an industry on the verge of penetrating nearly every part of the globe? But for some reason, technology stocks got off to a rocky start in 1997. Indeed, by early spring, floundering technology stocks were dragging the market lower.

Pundits emerged with a number of reasons for the downturn. Company profits were thinning. Capital spending plans weren't up to snuff. Rumors that personal computer sales were stagnating streamed through the marketplace.

On top of that, whiffs of inflation were driving interest rates higher and the whole stock-market dream started to feel more akin to a bad dream. The Federal Reserve was supposed to jack up interest rates and drive the economy into submission before inflation could get a stranglehold. All of

turned into the evangelists of summer. Why, this technology group was now so powerful that the traditional summer swoon didn't have to happen anymore. Companies were buying software and network systems and computers throughout the year, not just in cycles. Nations had to get their networks up to snuff—and there could be no delaying that effort, lest they fall too far behind in the race to get wired.

Higher and higher the technology stocks stormed. Dell raced to 102.875 by Oct. 15, and nobody thought it strange that the PC retailer at that point had gained 891 percent since the end of 1995. (It ended the year at 84.) Intel raced above \$100, and Andy Grove became a symbol of corporate greatness. It was fat city, and everyone holding a stock that had anything to do with technology felt like they had a golden ticket to Willy Wonka's great chocolate factory. Ah, bliss.

As Grove posed for a full issue of *Worth* magazine stories and Bill Gates achieved

The so-called technology sector became the market's star. The group has come to embody get-rich-quick dreams.

a sudden, just three months after 1997 opened amid blooming optimism, the technology sector started to look a great deal like a bunch of carmakers. Perhaps this invincible group was susceptible to macroeconomic realities after all.

Just as the gnashing of teeth became most intense, the group started to rally. Microsoft, in the doldrums in the spring, suddenly stormed higher. Other technology stocks joined the bellwether, racing into summer. For Wall Street veterans, the entire thing had a strange feeling. As surely as Fourth of July brings fireworks, the technology sector is supposed to skulk through the summer months. But instead of the usual technology summertime stall, the important leadership group took off like everyone and their brother would own a PC by Thanksgiving.

With a versatility that only Wall Street can produce, the fretsome pundits of spring

immortal (evil or good, you decide) status, the market turned a bit more finicky. Nothing embodied this fickleness better than the semiconductor equipment stocks. Applied Materials Inc., the star of this sector, soared 193 percent to 52.75 by Oct. 13, but ended the year with a more modest gain of 67 percent at \$30.13 a share. The explosion in chip building had started driving down certain chip prices, and Wall Street started to fret that maybe the number of chip fabs couldn't grow to the sky. Overcapacity concerns? That sounded more like a problem that would periodically strike the pulp and paper industry.

These capacity concerns, and questions about how many personal computers could be sold in one lifetime, started to darken the rose-colored glasses in late summer. The networking group, perhaps the most important leadership group for Wall Street players, began to fray. Ascend Communications

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Inc. got off to a quick start, jumping to \$78.75, a gain of 26 percent, by Jan. 26. But from there the stock skidded, ending at \$24.50—a loss of 61 percent for the year.

3Com Corp. skidded from the get-go, dropping 64 percent to \$26.38 a share by April 21. The stock had a modest summer rally before ending the year with a loss of 51 percent at \$36. Despite the year's swings, networking giant Cisco Systems Inc. ended the year at \$55.75, good for a 31.4 percent gain.

The reason this group is so important is that the wiring of the world plays a funda-

mental role in the technology boom scenario. If the builders of the networks find themselves struggling to maintain growth rates, then what does that mean to all the PC makers and software developers working feverishly to fill the expected demand of these new networks?

All focus, of course, was on technology. Sure, bank stocks were soaring and consumer staple stocks like Coke couldn't grow quickly enough to satisfy an army of buyers. But never mind those boring companies. Technology held the market in thrall.

As pundits parsed Microsoft's Internet strategies, rumbles could barely be heard across the Pacific. In July, Thailand ran into problems. But that was just Thailand. Then the fever spread to neighboring countries—Malaysia, Indonesia. Still easy to shrug off. Then came late October.

The collapsing Asian markets (see "The Asian Crisis," page 121) sent Wall Street into turmoil—tumbling stocks, people talking about countries we couldn't find on a map, so many pundits blaming ringgits and rupiah for woes here at home. Stocks

continued on page 116

Venture Capital in 1997, '98

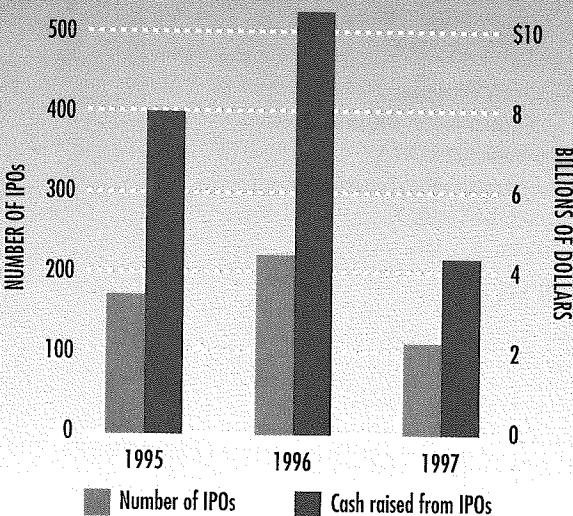
Although the number of venture-backed technology IPOs dropped dramatically in 1997, all was not lost. Venture capitalists still backed new tech businesses, but were more selective about where they put their money; they demanded solid business plans and top management teams. Nothing unusual there, but look for an increased effort to make safe bets in 1998, as the window for initial public offerings seems temporarily closed. That doesn't mean deals won't get funded, however.

"VCs are funded to the gills," notes Rolf Selvig, director of business development at Venture One, a San Francisco-based research firm that tracks venture capital deals. "The money for 1998 has been raised, and VCs are going to spend it."

In 1997, IPOs of venture-backed companies fell from 1996 totals. According to New York-based Technologic Partners, only 106 venture capital-backed technology companies went public in 1997, down from 225 in 1996 and 177 in 1995.

IPOs take a beating in 1997

Venture capital-backed technology and tech-related IPOs dropped sharply in 1997.



Source: Technologic Partners, New York

Selvig says that if 1997 looks bad in retrospect for IPOs, it's partially because the preceding few years were so robust. During the third quarter of 1997, 39 venture-backed companies completed IPOs, compared with 50 in 1996's third quarter. In a third-quarter report (the latest data available from Venture One at press time), Venture One stated that "without a dramatic increase in deal volume during November and December, it appears that 1997 will conclude as the slowest year for venture-backed IPOs since 1991."

Selvig predicts the IPO doldrums will continue into 1998, with only solid companies managing public offerings. "Good companies with solid technology" will still get out, he says. Tony Sun, managing general partner of the VC firm Venrock Associates, agrees, but cautions that IPOs "may take longer and cost more."

The tightening of the IPO window will also affect VC funding practices, sometimes in less-obvious ways. "There are psychological effects when there are no [IPOs], and high tech gets hammered in the markets," Sun says. "It affects how [venture firms] invest down the road."

Other VCs say that the amount of money invested by private and corporate sources ensures that many startups will be backed. That means tougher competition for Wall Street's attention later on, especially in a tight IPO market. "There is so much money out there," says Ted Schlein, a partner at Kleiner Perkins Caufield & Byers. "For every good idea, there are five or six companies being funded."

The IPO market's slowdown has affected not only which companies VCs invest in, but also at which stage they invest. Many funds backed companies at a late stage in anticipation of an IPO opportunity because such opportunities didn't come along that often. "An [IPO] correction is not unwelcome [at an early-stage firm]," says Jennifer Gill Roberts, a partner at Sevin Rosen Funds. "A lot of people got lured into investing at a later stage."

However, because many firms joined with other VCs at a later stage, return on investment was, in many cases, disappointing. With so many hands in the cookie jar, the IPO riches were spread thin among VCs.

Still, venture capitalists aren't headed for the poor house. "The main partners at the major VC firms are still making from \$5 million to \$12 million a year," Selvig says.—Jim Evans

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'The
street
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gkits
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e 116

Large electronic OEMs are capable of astonishing feats of agility. But first, they have to pick up the phone.

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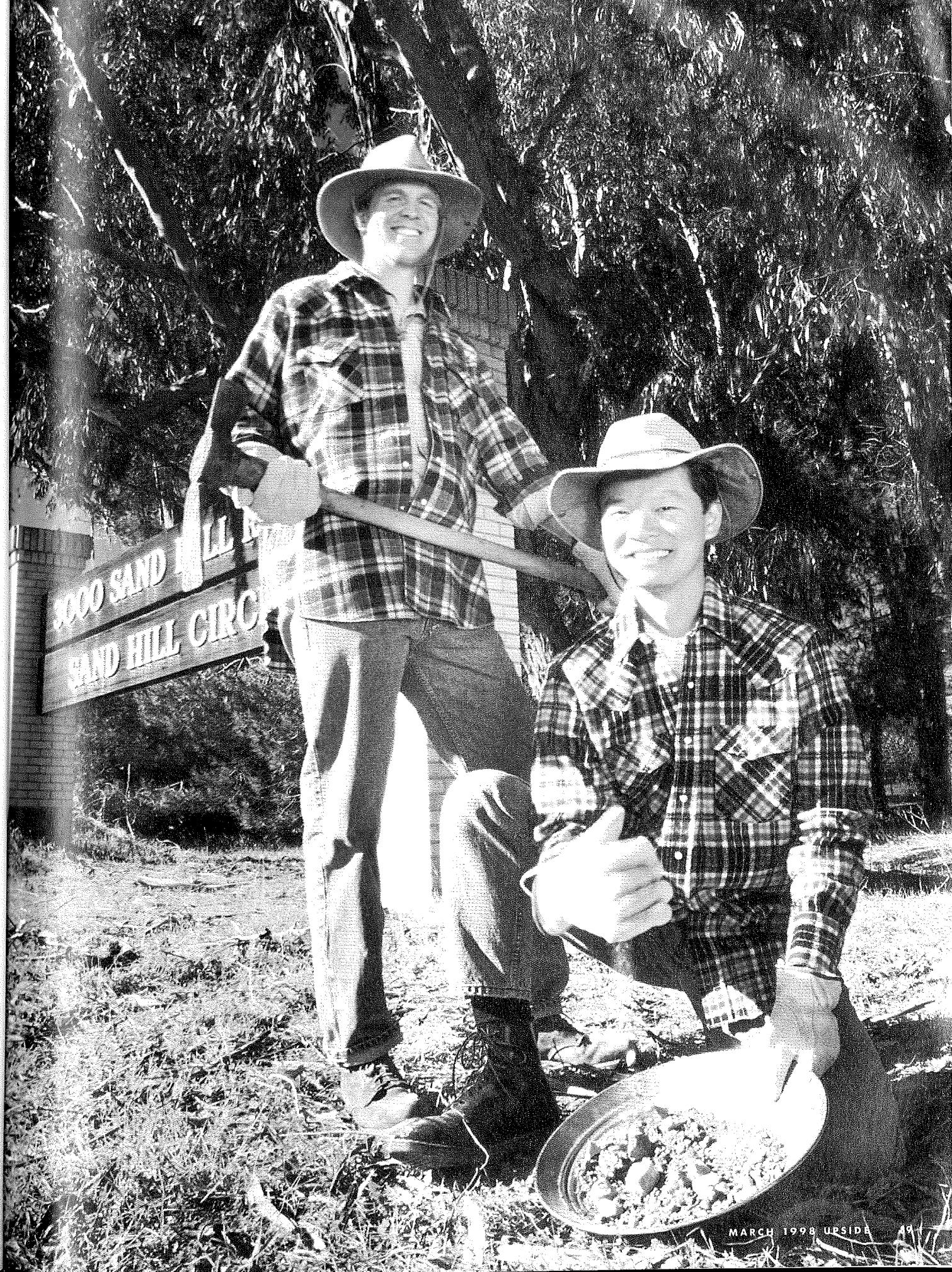
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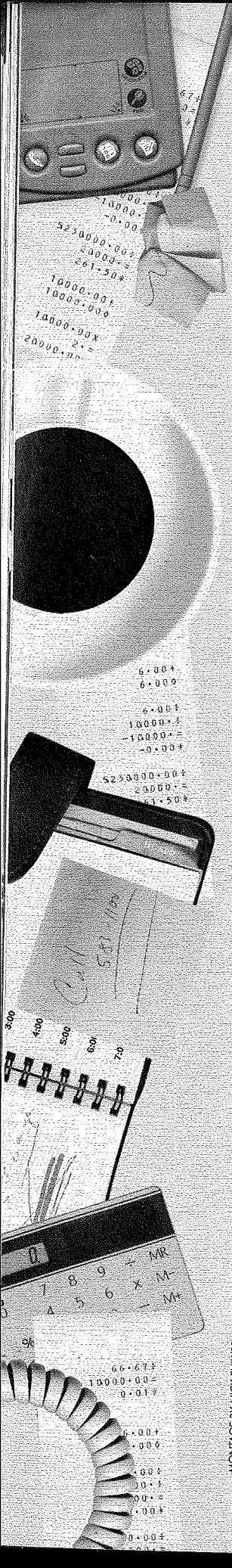
Diary of a Startup

BY TIA O'BRIEN

Whistle Communications Corp.'s Gordon Ritter (left) and Jim Li (right) went on a mining expedition on Sand Hill Road in search of venture capital. But courting wily venture capitalists, and excavating gold from their swank Menlo Park digs, proved much tougher than Whistle anticipated.

PHOTOGRAPHS BY PETER STEMBER





"The Machine that is Sand Hill Road has its own tactics for getting what it wants."

—Gordon Ritter, co-founder, Whistle Communications Corp.

Ritter should know. He and his partners went up against The Machine when they hit Sand Hill Road looking for funding two years ago, and they were almost crushed. They nearly blew the deal that Ritter and his two co-founders hope will make them owners of "the next Cisco or 3Com." All because Ritter thought he could dictate terms to venture capitalists on the hallowed knoll of Sand Hill Road.

Obtaining funding is a tricky game for entrepreneurs. How does a startup get investors to back the crop without getting evicted from the farmhouse and losing the farm? Ritter dared to toy with the money kings and lived to tell his story.

It's a story worth retelling.

There are two important things you should know about Ritter, 33, and his cohorts, Jim Li, 32, and Canh Le, 37—traits you don't usually find among Silicon Valley IPO-millionaire wannabes. First, they all hail from the trading desk of Wall Street's CS First Boston, not exactly a breeding ground for Internet startups. Second, because of their backgrounds in finance, these Masters of the Universe thought they knew how to play the Valley money game. Their egos were so out of proportion that they believed they could negotiate as if they had as much ammo as the VCs sitting across the table from them.

But their blind ambition and Montana-size egos are precisely what could propel these entrepreneurs—whose product, InterJet, provides easy Internet access to small businesses—into the stratosphere occupied by the likes of Bill Gates and Jim Clark. There's a lesson in this for all of us, which is why UPSIDE asked Ritter, the marketer of the Whistle Communications trio, to provide an inside account of how, despite some nearly fatal strategic errors, they struck a first-round, \$4 million venture capital deal with two of Sand Hill Road's most prestigious firms. This is a true story, reconstructed through the careful notes Ritter kept. We asked him to edit those notes, putting them in diary form.

It begins with the trio's first startup, Tribe Computer Works. In 1990, the three quit their high-paying Wall Street jobs, move to Silicon Valley and invest \$100,000 of their own money to start the company, which focuses on building net-

working hardware, including remote-access devices and routers, for small businesses. Under a rough division of labor, Li engineers the technology, Ritter handles marketing and Le oversees operations. Tribe wins some industry awards but is hamstrung by its niche market and inexperienced founders. It turns a modest profit.

Then one day in spring 1995, the company's 22-year-old Webmaster wanders in from an all-night rave and figures out that customers could use the Internet to manage network devices such as routers and switches, cutting down on a lot of hassle and cost. Li and his engineering team develop the idea into a software product they call WebManage. They figure it's Tribe's ticket into the Internet game.

To appreciate why the Tribe guys were so excited about WebManage, you must understand the Valley's state of mind in late 1995: Netscape Communications Corp. delirium. The Web browser company successfully floated an August 1995 IPO, without earning one dime in profits. All on the promise of the Internet.

Ritter could just see WebManage catapulting them into the IPO arena.

Dear Diary

May 1995: Jim [Li] was initially skeptical about the WebManage concept, thinking it was a gimmick. But I'm convinced this will be a breakthrough for the networking industry, along with being the big break Tribe needs to get above the fray. Not only will it help us sell more routers and remote-access devices, but the recognition that we invented this technology will position us at the front of a wave I know will appear after we announce.

Ritter hits the road to win that recognition, making the rounds to analysts and tech journalists. One article declares WebManage "the future of user interfaces for network-based devices." The trio starts using Tribe's money to further develop WebManage. The once-skeptical Li—Tribe's tech brain—now works on advancing the technology.

Li's original sketch of the product shows a

MONTAGE BY NICK PHILLIPS

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Diary

device that looks like a Batphone: plug your small business' internal computer network in one end, then plug in your phone connection and dial up your Internet service provider. Within minutes you can surf the Web, get e-mail, even create Web pages secure behind a firewall—no more expensive and confusing networking gear and pricey network consultants. Tribe estimates that this Internet-in-a-box, which is now called InterJet, will sell for about \$2,000 to \$3,000—pennies compared with the tens of thousands of dollars small businesses spend each year on networking gear.

One small problem: InterJet is sucking the cash blood out of Tribe. The trio agrees that InterJet is bigger than Tribe: It's a whole new company. But they need cash to launch it. Do they risk losing control of their product by bringing in venture capital, something they've carefully avoided with Tribe? Or do they tap East Coast angels, private financiers from their banking days?

Ritter, Li and Le huddle and weigh their priorities. They conclude:

1. We don't want this company to go to the moon—we want to go to Pluto!
2. We could get \$4 million from angels, but it's "dumb money." We'd have to coddle them with no value back. The VCs bring value with their startup experience and connections to communications giants such as AT&T Corp. and MCI Communications Corp.
3. We want to be rich!

Hands down, VC money offers the fastest ticket to an IPO. But the entrepreneurs are nervous about letting the Valley's notorious money men in on their deal. "We'd heard all the horror stories," Le explains.

Enter Fate

July 15, 1995: Cocktail party at the home of Marie Vought [a friend] in Menlo Park. At the party, I meet Eric Archambeau, CEO of DataMind. I mention that we may want to go to the VC community to build our new company. Eric tells me about Woodside Fund and Trinity Ventures.

However, Archambeau also warns Ritter to hire a lawyer before tangling with VCs. He gives Ritter a name—Josh Pickus at the Venture Law Group (VLG), a law practice in the thick of Sand Hill Road.

Three weeks later, Ritter and Li pile into Ritter's Honda Accord for their "first encounter with the VC community." (Le, meanwhile, stays at Tribe to mind the store.) Thanks to Archambeau's connections, they've won meetings with Woodside and Trinity. They go first to Woodside, where General Partner Vince Occhipinti and three of his partners are eager for a presentation, even though the Tribe guys lack a business plan detailing how they'll make money from InterJet.

As the Accord winds past horse-country estates and eucalyptus groves, Ritter and Li grow edgy. Are these VCs the kind of heavy hitters they're looking for? The group works out of a private Woodside residence.

Aug. 8, 1995: We wondered why they chose this location for a fund if they were looking for credibility. The rest of the firms on Sand Hill Road are very conscious of their addresses, and this was in sharp contrast.... Vince and his three partners sat at an immaculately set table, with fruit, scones, coffee and tea in polished silver serving dishes. We began by giving a quick overview of the product we're developing.

Ritter is surprised when the partners seem more interested in selling them on Woodside than scrutinizing InterJet's viability. The partners then caution the entrepreneurs to beware of predatory VCs. Ritter is wary.

Aug. 8, 1995 (cont.): They warned us that some high-profile firms will win your investment with a good initial deal and then use clauses in the contract to slowly take over the company, even trying to replace the founders.

continued on page 128

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No Foreigners

Immigration is a hot-potato issue, yet tech companies say they need to import more temporary skilled workers.



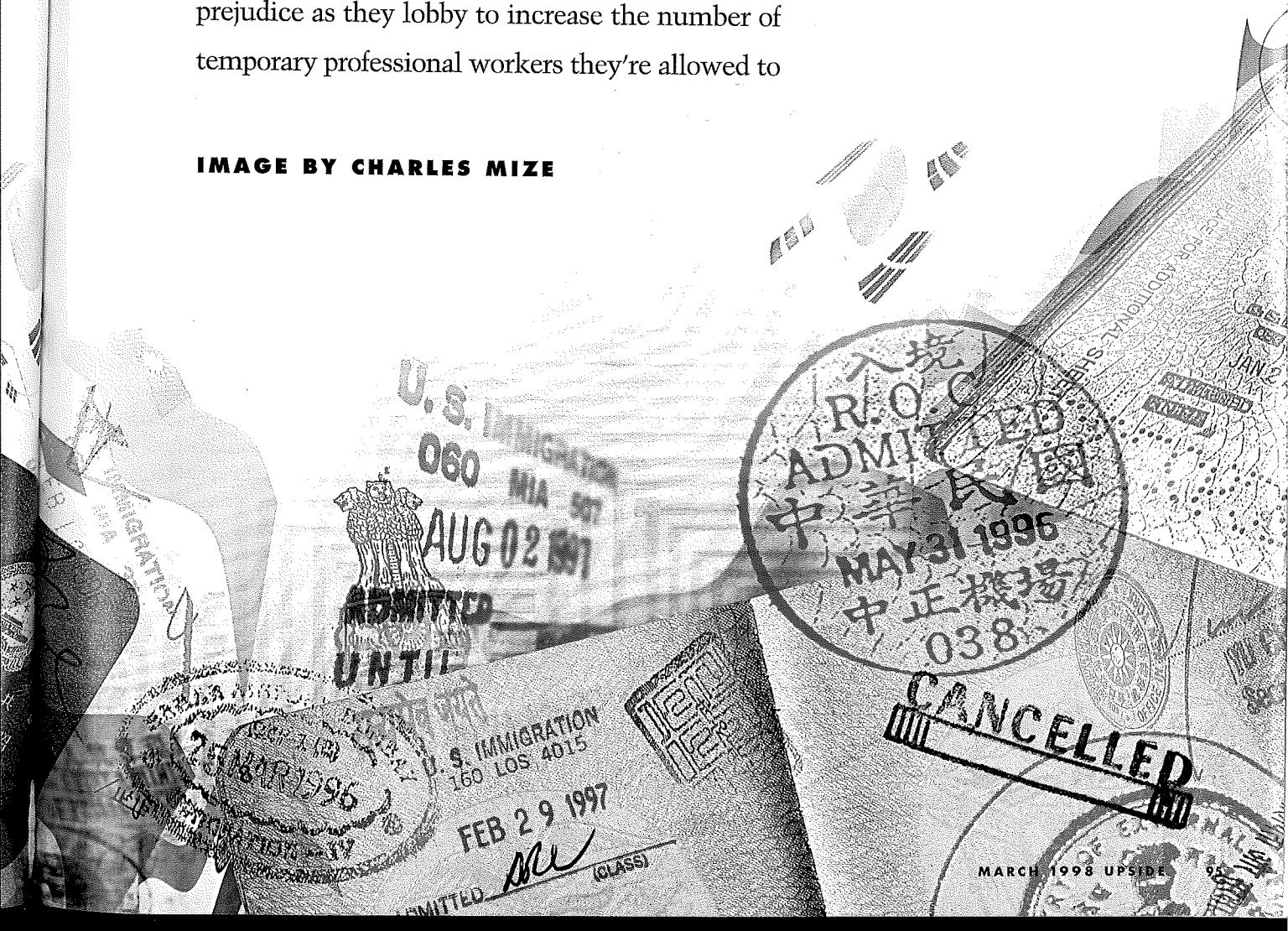
Need Apply

Cuban convicts, Cambodian boat people, Mexican farm workers and foreign-born engineers on temporary U.S. visas—surely these immigrant groups shouldn't be lumped together. Yet immigration foes act as though professionals from abroad pose a greater threat to American workers and American prosperity than these other much-maligned groups.

High-tech employers are fighting immigration prejudice as they lobby to increase the number of temporary professional workers they're allowed to

BY PAUL FRANSON

IMAGE BY CHARLES MIZE



Foreigners

import each year under the H1-B immigration designation. Last year, the number of slots in the H1-B visa program ran out in September. And without an increase in the number of workers allowed in under the program, observers say this year's slots will run out in June 1998.

Politicians are aware of, and in some cases, even sympathetic to, employers' plights. But observers question whether the nation's lawmakers will support such a controversial issue in an election year. Tech companies, policy makers and trade groups have difficulty agreeing what immigration policies should be. Further, supporters of expanding the H1-B program are afraid of opening Pandora's box: The issue of foreign workers is so volatile that wider visibility may lead to even tougher restrictions.

"There's little sympathy for expanding any category of immigrants," says Sen. Spencer Abraham, R-Mich., chairman of the House Subcommittee on Immigration. Abraham is acknowledged to have personally prevented proposed draconian changes in immigration laws in 1996. "Many people think we've already gone too far."

At first glance, the H1-B program seems innocuous. Originally set up to allow companies to bring in workers with specialized talent and skills, the "best

and the brightest in the world," it admits 65,000 temporary workers in specialty occupations for up to six years. That's if their employers will attest that they couldn't find a citizen or permanent resident with the needed skills. Last year, for the first time, the quota ran out. To meet the demand, 3,800 were "borrowed" from this year. With current demand, that ensures that the quota will run out even sooner this year. And like a run on a bank, this knowledge has accelerated demand.

What does this mean for high-tech firms? Very simply, they won't be able to hire foreign workers who don't have permanent status unless they possess extraordinary talents—for example, doctorate degree holders with specialized skills or renowned professors and researchers. They certainly won't be able to hire average engineers with bachelor's degrees, who are the mainstay of the H1-B program.

To put the program in perspective: According to the Immigration and Naturalization Service (INS), about 900,000 legal immigrants enter the U.S. each year [see "U.S. Immigration," this page], while about 300,000 illegal immigrants slip across the border or overstay their tourist, student or other legal admissions. Illegal immigrants are an insignificant factor in high tech, but a huge issue in voters' and politicians' minds.

The H1-B workers aren't immigrants according to government definition. They're temporary workers. In practice, however, this visa is considered a step toward permanent immigration in the minds of virtually everyone involved, from employees to employers and even government enforcers.

Politics Rears Its Ugly Head

The actual number of H1-B visa holders is tiny—5 percent of immigrants, 1/10th of a percent of all American workers. Hewlett-Packard Co., for example, hired only 150 foreign nationals out of the 6,000 new U.S. workers it brought aboard last year.

The political problem for high-tech companies is that voters often don't distinguish between legal and illegal immigrants, much less recognize highly skilled professionals. Further, much of the anti-immigrant fervor is based on a deep and usually unstated racism. Many of today's immigrants are from Asia or Latin America, not from Europe like most present citizens, and a lot of citizens would prefer that they stay home. Few feel comfortable in admitting that, so they cloak their opposition with more politically correct objections such as overpopulation and taking jobs away from citizens.

U.S. Immigration, Fiscal Year 1996 (ended Sept. 30)

Category	Allowed	Used
Immediate relatives	No quota	302,090
Family-sponsored	480,000 ¹	294,174
Employment-based	140,000	117,499
Professionals with advanced degrees	40,040	18,462
Skilled professionals, skilled workers, needed unskilled workers	40,040	62,756 ²
Chinese Student Protection Act ³ (almost completed)	Not applicable	401
Special circumstances immigrants	9,940	936
Illegal immigrants (estimated)	None	275,000
H1-B admissions ⁴	65,000	65,000

1. Minus previous year's immediate relatives.

2. Can borrow from unused priority categories above.

3. A program set up to admit Chinese dissidents after the Tiananmen Square demonstration.

4. H1-B admits temporary workers in specialty occupations for up to six years.

Source: Immigration and Naturalization Service Web site (www.ins.usdoj.gov)

"There's little sympathy for expanding any category of immigrants. Many people think we've already gone too far."

—Sen. Spencer Abraham

Corporate proponents of legal, employment-based immigration, in turn, decry racism and point to the accomplishments of immigrants. They downplay the obvious economic benefits of being able to recruit foreign workers—namely the ability to tap a wider and perhaps more malleable labor pool.

Moreover, the high-tech community and other immigration proponents make strange bedfellows. The groups supporting immigration are often humanitarian and ethnic organizations, some championing illegal immigration while condemning employment-based immigration as elitist and undemocratic.

This leads back to the problem for high technology and other industries that need technical workers. It's clear that the market for engineers and programmers is tight. CEO after CEO complains of being unable to find skilled workers, and cites hiring either permanent or temporary foreign em-

ployees as the only answer. They also say

they'll have to move facilities offshore if they can't find help. This is an empty threat because most large high-tech companies already have significant operations overseas, and they've been expanding their foreign operations for years to meet international demand, as well as to seek talent.

Lobbying for Relief

Industry groups have been mounting increasingly shrill campaigns to convince Washington of their need for help in loosening the restrictions on foreign workers. Perhaps the most active has been the Information Technology Association of America (ITAA), which is using the issue to subtly further its campaign to wrest the position as the voice of high tech from the once-preeminent American Electronics Association (AEA).

Last April, the ITAA published a widely quoted study that claimed 190,000 openings existed for information technology employees. However, careful examination disclosed so many problems with the study—from small sample size to questionable definitions of workers and their skills—that the ITAA has been using a figure of 95,000 more recently. The AEA also is on the bandwagon, though more with anecdotal than empirical evidence.

Whatever the evidence presented, there is clearly a shortage of the workers companies want. The question remains: if there's a shortage, why aren't all the permanent immigration slots taken? Last year, for example, only 117,000 out of 140,000 were used.

The most obvious reason is that it takes a long time to get a green card, typically two or more years. In addition, some companies are using the H1-B not as a way to hire desperately needed skilled workers, but as a probationary period or even worse. These temporary workers have few rights. They can't legally leave their employers. And though they're supposed to be paid at prevailing rates, there's little enforcement of this rule.

A Broken System

No less formidable a critic than the U.S. Department of Labor's inspector general issued a scathing report on the program in May 1996, stating, "The system is broken and needs to be fixed" (<http://gatekeeper.dol.gov/dol/oig/sars/sar0996/oa2.htm>).

The report condemned the employment-based, permanent labor certification program and the temporary H1-B immigration program administered by the Labor Department's Employment and Training Administration.

Specifically, the inspector general's office found that the H1-B program "serves as a probationary try-out employment program for illegal aliens, foreign students and foreign visitors to determine if they will be sponsored for permanent status."

The report found that some H1-B workers were subcontracted out by their employers—clearly a violation of the program—and many were either paid less than prevailing rates or the employer couldn't demonstrate that they were paid properly. As David S. North, a former assistant to the secretary of labor and author of *Soothing the Establishment: The Impact of Foreign-Born Scientists and Engineers on America* (University Press of America, 1995) points out, "There



U.S. Representative
Zoe Lofgren, D-Calif.



Senator Spencer Abraham,
R-Mich.

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Larry Keeley

The Doblin Group uses a heady mix of social science, strategic planning and design tools to decipher consumer behavior. Their multi-year consulting projects help blue-chip companies such as Xerox, Motorola and Texas Instruments arrive at the future on schedule with breakthrough products, strategies and markets. They must be doing something right: Information technology company Perot Systems recently bought the Chicago firm.

Doblin describes itself as constantly studying "the intersection between an enterprise, its customers and their behavior."

To talk with Doblin Group President Larry Keeley is to take a quick trip through the next five years. In his prairie-flat Midwestern accent and matter-of-fact manner, he paints enticing scenes of what appear to be sensible extensions of today's realities—minus fusty thinking, logistical dead ends or fools at the helm.

UPSIDE: I never see Doblin described as a market research firm. Why not? Isn't that what you do?

Keeley: The U.S. market has spent approximately \$9 billion a year on market research. The vast majority of that is spent to help people convince themselves that the direction that they really wanted to go in is acceptable. The usual mission [of market research] is to say, "Look, in the foreseeable future we'll have these kinds of widgets. Tell us who out there might need widgets like these and what channels and publications and avenues we have to get to them." [While this is] an important area, it's frequently in conflict with our mission, which is to invent something new. Sometimes we call it the Monty Python School of Consulting: "Now for something completely different!" That is very disconcerting to market research firms and professionals.

All of whom have a vested interest in the status quo. Oh, absolutely. [But what's] interesting is that over the last few years, we've been encountering market researchers who are aware that the tried-and-true methods are simply not delivering the results that they expected.

PHOTOGRAPHS BY KURUNA-DOBBLIN GROUP



Keeley

Nuts and Bolts

How do you go about describing your methodology? Very few companies in the world understand the new discipline of strategic design, so a very big part of our work is simply telling stories. We talk about how the world is changing, and we do that in a way that uses our methods. We never talk about client work specifically. Invariably the podium gets stamped after by 10 people, and the typical ratio is that eight of them want to work here and two of them want to hire us.

The real issue is that design planning is a new field that lives approximately where business administration lived 40 years ago. Then there were not many institutions that granted certificates suitable for framing that said "MBA" on them. It logically follows that there were not a huge number of corporations standing in line outside of those institutions eager to hire those warm bodies. Yet 40 years later, MBAs are pervasive.

How do you characterize design planning?

Most people are initially reluctant to believe that they can go to a little enterprise like ours that does planning and say, "Why don't you tell us about our entire industry and the changes it's likely to go through."

"Hey, I've got an idea," says the CEO, "send out a purchase order for a new vision!" The CEO who was given to that would normally, in our Western, macho culture, be chided as a member of the weak, the halt, the lame and the infirm. And yet one of the best things people can do with design planning is to say, "Gosh, everyday life is sure changing a lot, isn't it? Can somebody tell me the attendant structures so I can use those systematically to guide the things I invent, the mergers or acquisitions I consider, the investments I make, the technology I pursue, the people I add to my personal network?" It's amazing to me how in the pace of change today there's really no substitute for being thoughtful about what patterns exist.

Which is why I presume there's a need for an outsider to give perspective. But except for the most innovative companies, it can be tough to

stop running in order to take a look at something different. One thing that's great is the pace of modern times, with the attendant chaos and the surprising combinations that are at the heart of modern business successes, more and more people are willing to say, "I don't understand everything that I'd like to understand."

Let's turn the time machine backward seven years. I'll give you a vivid example. Imagine you're an entrepreneur and you want to go see some venture capitalists,

The Doblin Group

Headquarters: Chicago

Founded: 1979 by Jay Doblin

URL: www.doblin.com

Number of Employees: 45 professionals, no titles

Ownership: Private

Main Business: The Doblin Group is an innovation planning firm that cross-fertilizes strategy with the design of products, services and brands to create breakthroughs—innovations that reshape industries. The firm does this by simulating new business concepts with prototypes that make a strategy tangible.

Selected Clients: Aetna Insurance, Amoco Oil, Hallmark, J.C. Penney, Motorola, McDonald's, SAS Airlines, Steelcase, Texas Instruments, Thomson Consumer Electronics

and here's your pitch: "I have this great idea: I'm going to sell coffee for 500 percent to 600 percent of the prevailing market price." And the questions start to come, right? "Doesn't everybody on every street corner sell coffee already?" Yeah. "Isn't it a hugely fragmented industry?" Yeah. "Isn't there a prevailing market price? ... And you want to do what? With our money?"

It's not going to be a very pleasant conversation for that guy on the griddle. And yet, as people build a product offering around the creation of a culture—stand in a Starbucks and just listen. You'll hear a special language emerge—"I'd like a half decaf, tall double mocha"—and you think to yourself, "I don't think that would have happened at the local 7-Eleven."

Wanted: Breakthroughs

Talk about the kinds of companies that seek you out for projects. It's typically large enterprises in the throes of complex change:

People who recognize that they don't know what they ought to be doing next. And they come not only to us, but to the growing number of fledgling competitors that we have. We love to have competitors; we think it legitimizes the field. And companies show up at IIT [Illinois Institute of Technology] and try to hire graduates.

What part of your work is telling the client, "Here's the big picture, since you've asked us in," and how much of it is doing fieldwork specifically geared to the company's products or whatever they're interested in looking at?

A large number of them come, not surprisingly, for a very specific product or service breakthrough: "We're in the X business, but we haven't had a really great product in the X business for awhile. Can you guys do that for us?" Some of them come and ask us, "We have this company whose strategy seems out of focus. Can you think about its capabilities and give us a deeper sense of what's possible?"

That is much more valuable, because there we get into issues of brand or channels or how we can reshape multiple products. Others come and they talk to us about entire areas of change, what we call "arenas." A client might say, "The worlds of communications and commerce and branding are coming together in something I don't understand. Can you tell us about those sorts of rushing rivers and how they come together?"

The thing that's always shocking to me is that when people ask for the more aggressive [picture], we can usually give them results that will add an incremental billion dollars a year in sales. When they ask for something like a product breakthrough, we'll give them something that will contribute \$100 million a year in sales or a little more. And my cost structure for doing this work is the same. I put together the same kind of team for roughly the same duration.

Motorola came to us year before last and said: "Our venture work hasn't been very successful. We have a corporate new enterprises unit, we invest money, but we have a very low hit rate in the companies that we select." We worked with them for a whole year. The first quarter was spent reinventing their process, and the next three quarters were spent studying an arena each quarter. So we changed their

Three All-American Reasons To Look to France for Growth.



In a tight employment market, the talent you need to make your business grow isn't just hard to find, it can also be prohibitively expensive. That's why smart companies are locating in France. After Americans, the French have the highest education level in the world, so France offers experts in virtually every specialty, from biomedical researchers to software designers. And, even taking into account the costs of social benefits, French talent is surprisingly affordable.

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Keeley

investment processes and areas of study, and their resulting hit rate was about 30 times more successful than what they enjoyed before. They shut down the effort because suddenly they had too many opportunities that were succeeding too much and absorbing all of their capital.

What's the length of your typical client relationship?

Compared to McKinsey & Co., which builds everything around 16-week engagements, our client relationships typically last about three years. That'll be composed of maybe 40 different projects.

The Fundamentals

I've heard you talk in the past about Doblin's research on popular trends in entertainment, in community. But how do you approach companies in a more technical business, like a Cisco, or a chip fabrication company? The reason chip companies come to us and Cisco doesn't is because Cisco knows how to pursue what it's trying to do without a huge amount of risk. But have you looked at the price of a wafer fab lately? Building a wafer fab is a \$3 billion hit, and in the boardrooms of America's corporations where those kinds of things are debated, people want good reasons why a \$3 billion wafer fab is going to be really useful. They want some proof that if they spend that money now, they'll get the first integrated circuit in three and a half years and then it's going to be a hot winner—because if it is, you're coining money. And if it isn't, then you have a financial catastrophe on your hands. We've been asked to solve precisely that problem, and have solved it by giving rich insights into everyday lives that can be used to decide about future digital market spaces.

How people use chips in their daily lives, in other words. Yes. Our stock-in-trade is to dissect the quotidian dimensions of our lives. What do people do to read their newspaper, where do they eat, how do they get themselves educated, how do they make sense of health care, what do they do to entertain themselves or their families, and how is that different in India than it is in China or Iowa?

How far out will you go in projecting a trend? I'll just make one up on the spot so that you can get a sense of that. It's obvious to everybody, you can buy Gartner Group studies to prove that there will be more computers in the home, right? What we're interested in is what happens to transform different domains of the home, like the infrastructure systems for heating, ventilation and air conditioning, security and locks, the kitchen or the entertainment center, as more computing power is brought to them.

Of course we're also interested in the fact that more wealth has been created around the computing domain in the past 15 years



or so than in any prior time in history. And yet just 7 percent of the global public uses computing devices.

Seven percent? Yes. So there's some upside there, to borrow a phrase—but will it be today's computing devices that they'll absorb? I hardly think so. It's going to have to get a whole lot easier and pervasive in more natural ways before the 93 percent of nonusers really absorb it. That's what causes us to speculate wildly about how home entertainment might become both more theatrical in scale but also more pod-like. You climb into a nest-like thing where your ambient conditions are all controlled and you get some kind of experience that is very different from what we know today.

It's very obvious that something like that will come along in the middle distance.

What is the middle distance to you? For me a long-range plan these days is five to seven years, and a reasonable business plan is 18 months, and medium range is about three years. That's a gross average. Japanese planning firms are very romantic. They like to talk about either 50- or 300-year horizons, and we fall down laughing. Clients occasionally are silly enough to ask for 10-year plans, and we try to dissuade them.

We like to say that if we can give you a really great innovation that you can launch within 18 months, you will be creating the future, and you don't have to be so accurate about planning. An old [Peter] Drucker quote is "The best way to predict the future is to create it."

The Not-So-Distant Future

How is retail business going to change because of the Net? Human beings have interests, and up till now they have put the work in to connect their interest to either channels, companies or brands. What the Web is doing in the e-commerce space is allowing people's interests to be directly mapped to agile responses.

This caused us to create a theory we call "Web arenas." An important part of the near future will be the ability to align multiple enterprises around people's interests. If you can do that, you can be confident of capturing an unfair share of their attention—if you can use the power of UPS, FedEx and computing systems to make the back-end logistics happen.

Similarly we can just have an integrated, powerful site that deals with any interest: cooking, gardening, golf. You spend hours there, creating fantasy gardens or golf courses. But when you want to make some portion of your fantasy come to life, you will elect to do so.

And we'll be able to do so more easily than we can today? Right. What will happen is, a single carton will arrive the next day, via UPS or Federal Express, and in it will come all the things that are necessary for that garden of yours, including instructions saying things like, "Hey, Karen, this is for quadrant A of your garden, and these seeds should be planted between March 18 and April 17 of next year, and here's the bar code you should scan to control the watering

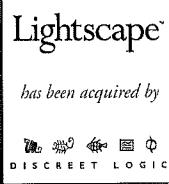
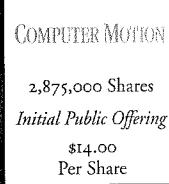
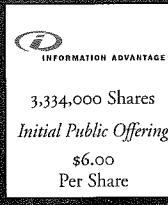
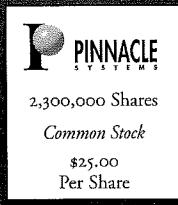
It doesn't matter where a good idea starts, but where you take it.



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sensors, governing the way in which the Ortho fertilizer, which is also enclosed, will be dispensed. We'll use simulation techniques to show you how your garden would look at different seasons of the year and after 20 years."

So we can have wildly different intentions and find that 20 companies align their enterprises around serving them. Then why do I need a store?

"And by the way, Martha Stewart is coming to town and giving a lecture"—to whom you may have granted a license to comment on your design....

The work we did on compelling experiences came from our realization that in a world where too many things are offered and we have too little time, we pay attention to the stuff that somebody's gone to the effort to make compelling.

One of the compelling things right now to many people is going shopping in stores. That's presumably speaking to a need that's missing in your scenario. Right. So you're sitting two blocks away from the world's most successful retail street, Michigan Avenue's Magnificent Mile. Every store on it has been converted to a showcase store. None of them, on the world's most successful retail street, are expected to make a conventional return per square foot. Not a single store there is expected to be profitable per se. They're all expected to burnish a brand.

So what you'll see in retail stores of the future is a combination of fabulous experiences, fueled by capital that used to be spent on advertising. These store experiences will remind people that they ought to be emotionally involved with some enterprise.

What you can do is give people a vivid enough experience so that when they're standing at a deep discount channel, like SportsMart, and they're trying to decide between the Reeboks and the Nikes, they're willing to pay \$1.50 more for the Nikes, and over enough time that kills Reebok. I will continue to make retail stores, as a company, but it's imperative that I do so while providing vivid experiences for really low cost.

Clear Winners and Losers Who's going to make the interactive TV/ WebTV market work? Who wins in that space?

That's a classic example of the kind of question I get from people looking at the world through the technology lens. The way you answer that question using design planning is to look at the home and what goes on there. Why is it suddenly changing so much? When you look not from the vantage point of new cool capability, but instead from the vantage point of what's happening in people's homes and how might we foster that over time, you get a richer set of answers.

"Our ideas tend to pose trauma-inducing challenges."

How do you look at the home, then? The R&D the Doblin Group does is centered around one of the eight areas of everyday life in most rapid change: leisure, work, retail, education, health, travel, money, home and family. Some are changing faster than others, whereas government changes at a stately pace, right? That's why we're so annoyed with government most of the time. But what is going on in the home? Whether you look at it as a place, a collection of processes or a grouping of people, the home is in remarkable transformation.

I hate to be unresponsive to your direct question, but the cable modem thing is going to be part of a [phenomenon] that simply accelerates what's already happening in the home, allows it to be as functional a place as the average office is. And so who will win? The people who will stop looking at it as technology and start looking at it as a collection of powerful activities.

Look at the PalmPilot, for example. Tons of organizers out there, but [Palm Computing] created an affordable one that does the basic thing that people need over and over again. It synchronizes with the

mother ship (the personal computer) and gives me the things that I need most reliably and easily: my to-do list, my contacts, my agenda.

So people will create beachheads that succeed, and the beachheads will have to be things that tap into people's interests or needs.

Perot Systems' Acquisition

How has Doblin's being acquired last year by Perot Systems changed or broadened your work? The thing that's great about the Perot enterprise is it has honored the intention of the agreement. They knew that we were a unique resource, the world's largest design strategy firm. They also knew that we were different from them, and they were wise enough to say, "We don't know how to run you guys." What we negotiated for was to simply say, "None of us is going to cash out. We're all young people, but we have a road map in front of us that takes our work to new and vastly more sophisticated stages." So the first thing we were looking for was somebody with enough faith, trust and resources to say, "OK, we see where you're going and we're going to accelerate it."

But we're also looking for something else. We haven't done a case in seven years that didn't have at least two interesting effects. Clients see our work and they say, "Wow, what a cool set of new ideas." But those ideas also have, typically, big technological ramifications, and also a certain level of trauma-inducing managerial challenge, as in, "These are the great ideas that users need, but your enterprise is not aligned around them." We needed somebody who was really adept at that. The guy we work with most closely in the Perot organization is Jim Champy, who invented the field of reengineering along with Michael Hammer, and who is very thoughtful and compelling about helping companies [understand] what they ought to do to be totally different.

So our joining Perot Systems is working very well. We're about 60 percent to 70 percent larger than we were a year ago. And we're able to do things that have a lot more impact. Now we can envision something, we can technologically prototype it and we can organizationally bridge to it. It's a good thing. ■

Karen Wickre is executive editor at UPSIDE.

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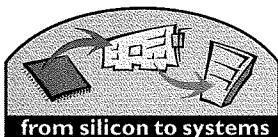


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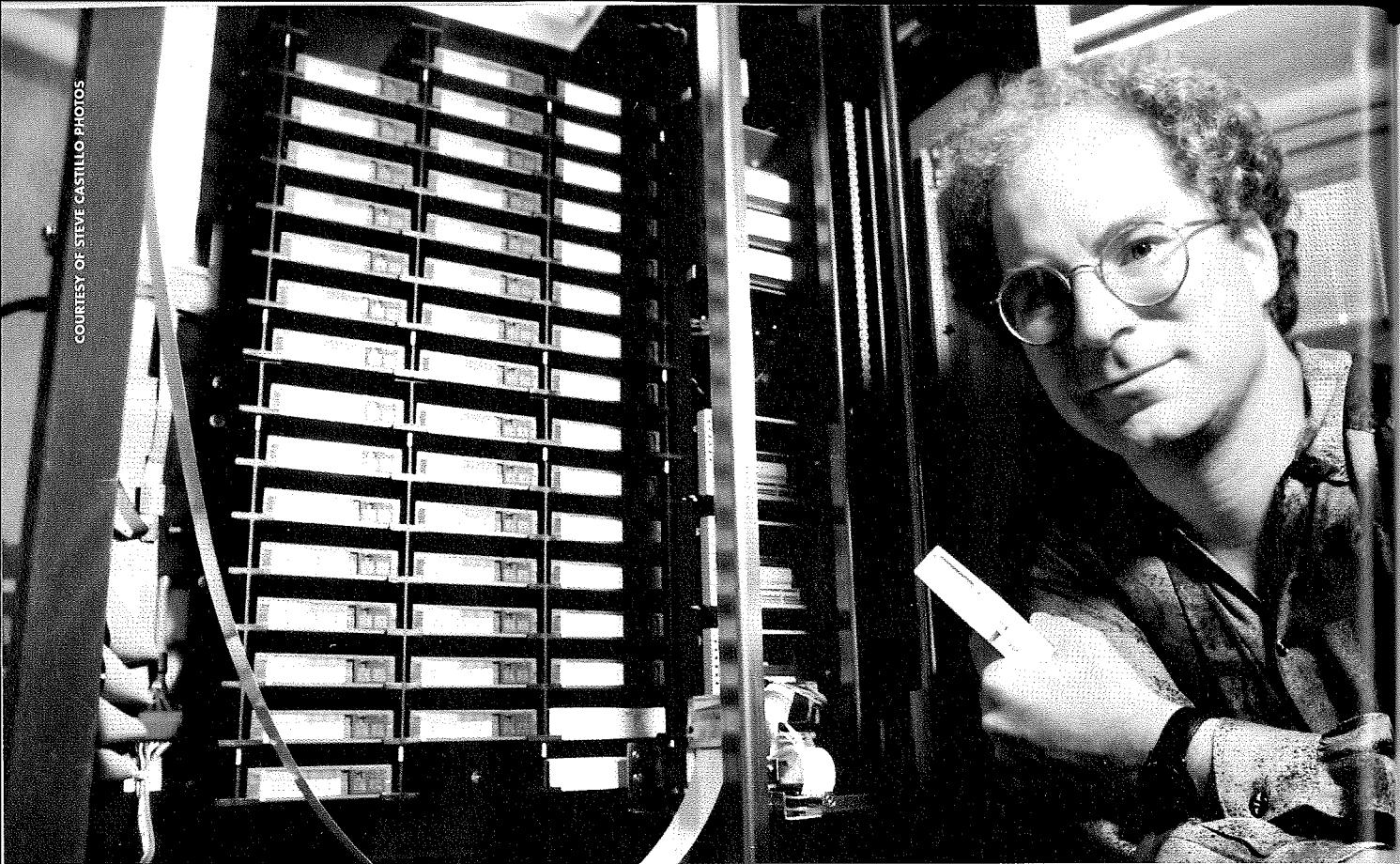
BY JEFF UBOIS

Monday morning—your first day back at work after a vacation in the tropics. The trip was fabulous, but what is that nasty rash under your arm? Trying to avoid a trip to the doctor you hop on the Web. Giving AltaVista a whirl, you type in “jungle rot.” The service goes on safari in the digital jungle, and then ... argh, information overload. Alta Vista has found 39,741 references to jungle rot. While you scratch uncontrollably, you lament, “Can’t anyone come up with a better way to sort and retrieve information?”

ILLUSTRATION BY KIM WILSON BRANDT







Brewster Kahle, president of Alexa Internet, San Francisco

Fifty years ago, presidential science adviser Vannevar Bush accurately predicted the rise of personal computers, information storage and search tools, and electronic commerce in the article "As We May Think," published in the July 1945 issue of *The Atlantic Monthly*. It has become one of the most widely cited scientific articles of the century.

Bush, who oversaw all U.S. wartime science efforts (including the Manhattan Project), worried that increasing specialization would soon stall scientific progress. Noting that "Mendel's concept of the laws of genetics was lost to the world for a generation because his publication did not reach the few who were capable of grasping and extending it," Bush proposed a solution called the Memex. He envisioned "a device in which an individual stores all his books, records and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility."

It was a great vision, but the promise of the Memex remains unfulfilled. While Apple Computer Inc. triumphantly announced it had completed the Memex

when it shipped HyperCard more than a decade ago, the modern approximation of the device is the sum of Internet search tools and navigation services.

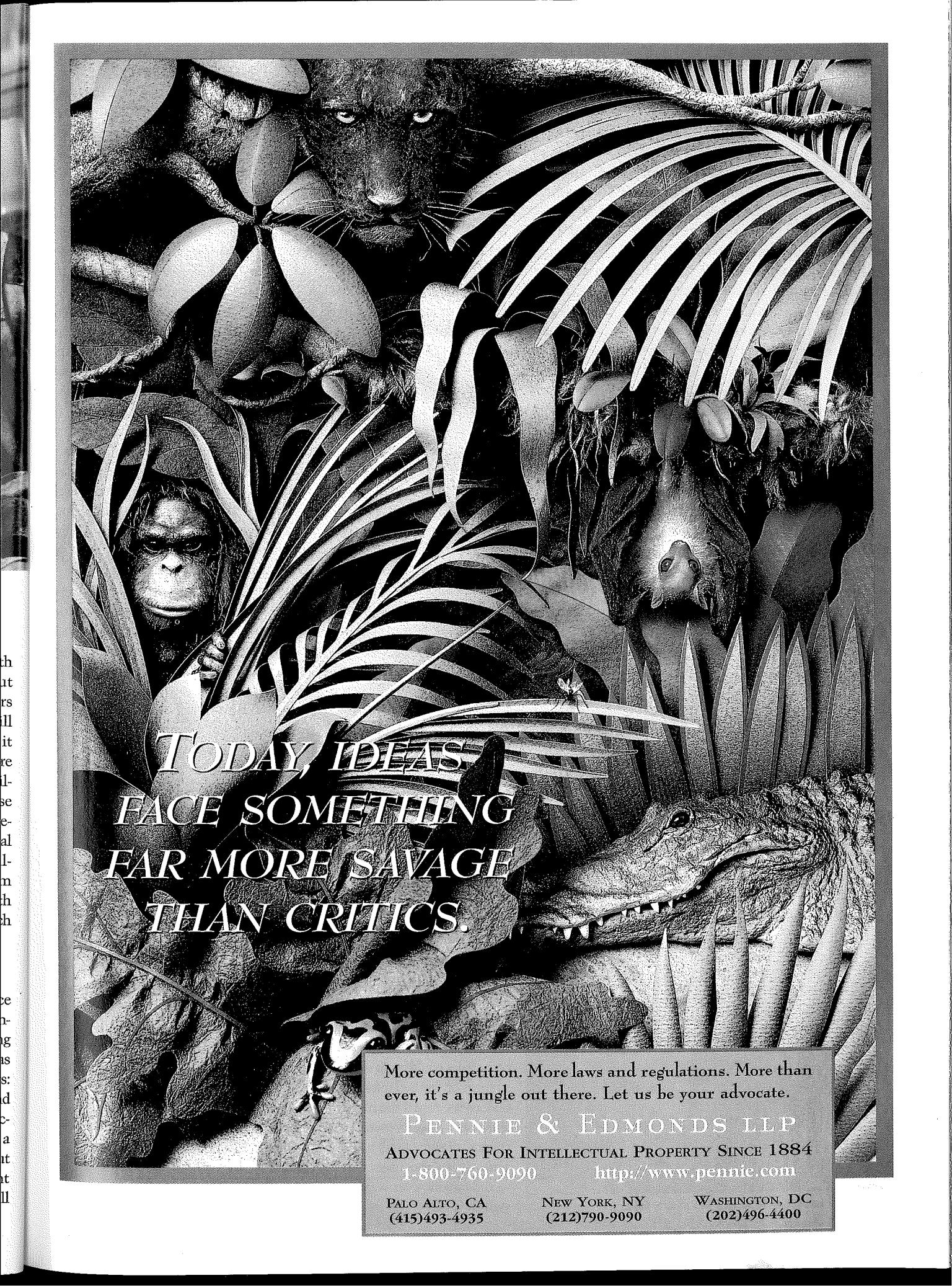
Punch in "travel" on Digital Equipment Corp.'s AltaVista search engine, and you'll get more than 7 million possible answers. That's noise, not information.

Companies offering these services have created billions of dollars in new market capitalization during the past two years

and are the core business of close to a fifth of the public Internet companies. But these companies and market observers agree that information searching is still harder and less comprehensive than it should be. So Internet startups and more established companies are investing millions of dollars in search research. These companies are pursuing a variety of strategies, including systems that provide visual representations of data, collaborative filters that gather recommendations from users, enterprise software enhanced with search capabilities and advanced Web-search engines.

A Difficult Problem

Search services have unified what was once a sprawl of uncharted fiefdoms on the Internet. But despite advances in processing and storage, the underlying approach has remained essentially unchanged for years: Users enter a few descriptive words and hope those words are used in relevant documents. It's fine for searching through a collection of a few thousand items, but punch in "travel" on Digital Equipment Corp.'s AltaVista search engine, and you'll



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get more than 7 million possible answers. That's noise, not information.

The explosion of data available on the Web is aggravating the problem. By late 1997, there were more than 640,000 sites and 100 million pages on the Web, and the number continues to double every six months. Without fundamentally new approaches, the number of documents returned by a generic search engine will grow at the same rate.

It's already causing changes in the way browsers operate. "We're looking at how to tightly couple the two main methods for information retrieval—search and browsing," says Susan Dumais, a guru in the field who was recently hired away from Bellcore to become a senior researcher at Microsoft Corp. But the real issue is deeper. The rapidly widening gap between the amount of data in the world and the

amount of attention available to process it means a growing percentage will never be looked at by a human. So the importance of search and filtering technologies will increase, even as new media types expand the challenge beyond the realm of straight text.

Searching for a Solution

"People have spent many millions of dollars trying to get traditional search technology to work," says Brewster Kahle, president of San Francisco-based Alexa Internet. "But as the amount of information and the number of people using it goes up, these traditional approaches are failing, and we need a new genre of answer."

Several dozen companies believe they've found it. Though they take an amazing variety of forms, business models and technical approaches, they all promise to determine the relevance of information for their users. Generally, they fall into three camps: free, ad-supported gateways to the Web; technical innovators; and enterprise-software companies.

A few of them will win big, as Yahoo Inc. already has. But most are fated to be acquired by big companies if things go well, or to close their doors. Search, filtering, personalization and agents—or whatever technologies eventually dominate—are too important to remain in the hands of small companies. Big companies need to own the best version of search, and they can afford to buy it.

It's not hard to imagine the commercial potential of the ultimate search tool or a magic relevance detector. Terabytes of unstructured information could be ordered and made accessible, duplication of effort would be reduced or eliminated, and companies could begin to get a return on unused information assets. And if the magic relevance detector were a channel of some kind, tuned perfectly to the user, why would anyone ever want to switch it off?

It's not hard to imagine the commercial potential of the ultimate search tool or a magic relevance detector.



Jerry Yang, co-founder of Yahoo Inc., Santa Clara, Calif.

Portals and Gateways

Start with that last question first. Providing a portal or gateway to other sites rather than generating original content made Yahoo and AltaVista immediate successes and is the core business of Infoseek Corp. of Sunnyvale, Calif.; Excite Inc. of Redwood City, Calif.; Lycos Inc. of Framingham, Mass.; Inktomi Corp. of San Mateo, Calif.; and others. But anyone can be a gateway, and several of the early Web indices have either been shut down or acquired.

To create a sustainable model, Web directories and search engines are evolving into media brands that create destinations rather than serve as gateways. Their new competition is not just America Online Inc., but television and newspapers.

"People have to realize the Web has grown so much since the search days, and there is a need to expand beyond that one function," says Jerry Yang, co-founder of Yahoo. "What we do is a media game, not a software game, and search is only a complement to the overall service, not the dominant element."

George Bell, president and CEO of Excite, echoes these sentiments. "Technology enables everything we do, so it is enormously important, but this business is about building and growing brands," Bell says. "I'm less curious about the search market and more curious about how to use the search technology to bring a more useful and convenient experience." Innovators in the Web-wide search business are trying to improve results by providing better categorization of search results, automatic suggestions of new terms, improved "refine" features that make it easy to try again and the use of personalized pages that are essentially saved searches.

Elite Content

Rather than make searches more exhaustive, some believe the quickest way to improve the quality of search results is to index only top-quality content. "It's strange that a lot of the differentiation in the search engines is 'I index the most documents,'" says Steve Krause, president of Affinicast Corp. of San Francisco, which makes server software that matches reader interest with ads.

One company working with premium content is Northern Light Technology LLC of Cambridge, Mass., which has combined

continued on page 146



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Continued from page 79

is to be device drivers. Microsoft made it a user interface and a programming environment, and all these other things.

Device drivers that allow you to print things and interface with the keyboard, and things like that, rather than a user interface? Right. The modern Windows UI [user interface] is not built to deal with the Net. You're dealing with a million times more files and applications than you ever were before, and people are getting overwhelmed.

So can you just put the device drivers into your user interface, which is the Internet browser, and obsolete the operating system altogether? That might be possible. The DoJ could conceivably open a wedge in the operating system market to allow other competitors to come in.

Browser Wars

If you make the browser free, how much will that loss of 13 percent of your revenues hurt?

We think we can take that out and replace it relatively quickly with this other stuff. This is a pretty good time to do it. One reason is because it's down to 13 percent now. [Another reason] is that we have to make adjustments in the business anyway. And [another reason] is the DoJ activity.

Does the browser revenue decline indicate that you lost more market share in the last quarter?

It's not about market share. The Microsoft free browser has become so widely available and there've been so many deals done that [market share has] become a separate issue from revenue. I mean, the revenue opportunity for client software is zero.

Right, but you have been collecting revenues from it. Does that mean that fewer people are adopting your browser? Or is the industry leveling off in browser adoption overall?

That's an interesting question. I don't know. It's hard to tell. It could easily be simply because fewer people are paying for it.

You measure browser market share by how many people visit sites with your browser. How are those measurements standing up?

They indicate about 65 percent, across a spectrum of Web sites. You can find Web sites where it's lower, and you can find Web sites where it's higher.

Where are the Navigator browser and Communicator [an integrated browser, e-mail, discussion and composition suite] going, besides to a price of zero? We keep evolving them quickly. We've got a Java version of Navigator coming out in the first half of this year, which will run on NCs.

I'm not sure what the market is for NCs right now, but is that someplace where you need to

"The modern Windows user interface is not built to deal with the Net."

be putting your resources? You can't actually buy one yet! It's funny, it used to be that new technologies would take a year or two or three to gestate and for products to ship. Now everybody assumes that as soon as the first press release goes out the products are going to go out. But we see a tremendous amount of development happening in computer companies, in consumer electronic companies and in startups. What they all have in common is they'll all have Java. The Java Navigator is basically a subset of the next version of Communicator.

Still, given that the NC market is still questionable, is this someplace you should be putting your resources? It's a small amount of incremental resources, and we're already doing that kind of work anyway.

You're already building the next generation of Communicator in Java? We're building large parts of the next major version, after Mercury, in Java.

What version is that? We're not supposed to say it, because we don't want to get sued, but [the code name is] Xena.

But today, the vast majority of machines with access to the Net are Windows PCs or Macintoshes. Do you expect a significant number of other clients to come out with Web access?

Over the long term, certainly. It's a matter of when and which ones. One of the things we're learning is that the products actually have to be designed, built and shipped. You can't run on imagination. If you use a TV, you have to assume the user will be 10 feet away, sitting on a couch and not much in the mood to be doing a lot of typing. Handheld devices certainly seem to be taking off now. Pagers have taken off, cell phones have taken off, handheld organizers have taken off.

Will all those be connected to the Internet?

Oh, sure. There's a lot of startup activity happening around this space, because the WebTV acquisition by Microsoft set the valuation benchmark to about \$10,000 per installed box! So the venture capitalists were writing checks the next morning.

Enterprise Expectations

What caused the slower-than-expected growth in enterprise software in the last quarter? A whole bunch of stuff. We are still in the process of tuning up our sales force and our special services organization, our training organization. That's especially true internationally. Internationally, our business has been [closely] tied to client software sales, both in Europe and in Asia. We need to radically revamp that.

We have new products coming on line. We just bought Kiva [Software Corp.] in Q4, so we're in the process of educating the sales force. That's going to be a large component of this by the end of the year.

You've had spectacular growth since your founding, great results on the enterprise all year, and now all of a sudden a sharp drop. I always get concerned when there's a sharp and unexpected drop like that for a company.

We appreciate your concern!

I knew you would! Enterprise sales grew more slowly than expected. The other thing you need to know is that enterprise software companies across the board, including all the database companies, over the last 10 or 15 years have worked themselves into a fairly bad position. Most of the sales come at the end of the

quarter. Customers have been trained across the board to wait until the last minute, and there is a tremendous number of deals closing at the end of the quarter. You get a tremendous amount of price pressure because of that, because the customers tighten the screws. You get deals that slip out of the quarter.

In retrospect, it would be nice to not have a quarter that ends with Christmas. You literally get into this conversation with customers where you're on the phone on December 24th and you're like, "Well, let's close this deal." And he's like, "Well, I know it's important to you to

right now? That's an interesting question. It's hard to tell. There is a line of reasoning that would suggest that the software industry is fundamentally changing a bit. The big trend that's been driving the industry growth for the last 15 years has been the fact that the percent of IT spending by businesses has continued growing year by year, and that continues. But it's getting increasingly hard for them to absorb large amounts of new software, this line of reasoning would go, because it's getting increasingly hard for them to find enough skilled people to be able to implement it. It's getting

scale intranet that is itself extended out to suppliers and distributors. It provides intranet, extranet and Internet capabilities. It does all of the management, directory, security underpinnings you need, it lets you manage content, it lets you build custom applications, it lets you do messaging, it lets you do collaboration. In other words, it allows you to run a modern network. We can uniquely give a business the ability to come up quickly with a new networked environment.

What are the prospects for e-commerce this year? There's a tremendous amount of business-to-business activity happening now. One reason for that is the high-profile success of both Dell and Cisco. Another reason is because a lot of companies, especially in the U.S., have built out their own networks already. So they've got full-fledged, deployed Internets that they want to connect to their partners and customers. It's all Internet protocols, and people see companies like Amazon.com and E-Trade leading the way. What you're seeing in '98 is all of their competitors in all these different industries being motivated by fear. Everybody's motivated by either fear or greed.

And greed is a better motivator than fear? Greed gets you there fastest.

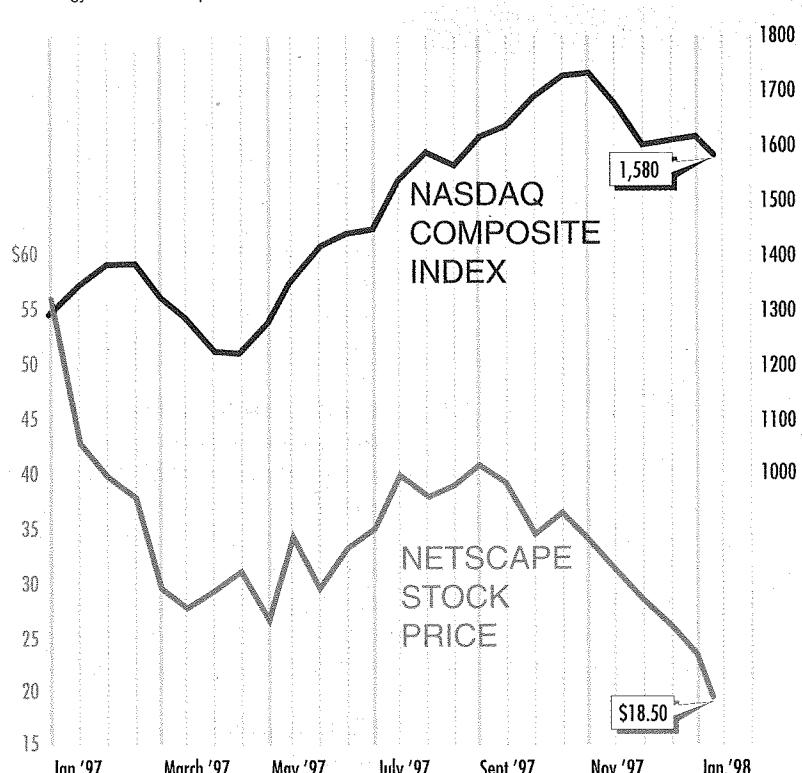
On the Web

What are your plans for making money off your Web site? Because of the Navigator-Communicator installed base, we've got tens of millions of users of this software who are all intrinsically linked to our Web site. It's a tremendous opportunity to be a magnet or an aggregator of content and services from a lot of partners. We've started to do that with Netcenter.

Beyond that it's an opportunity to start to do things more on behalf of users as well. For example, companies like Hotmail demonstrated that there's going to be a tremendous demand for hosted services for individuals and small businesses. You're not going to be charging the user for hosted e-mail, hosted discussion groups, hosted small business intranets. You're going to be giving it to them along with the client software, and then you're going to be using that to build a community into which you're going to offer different kinds of content and

NETSCAPE vs. NASDAQ

While the Nasdaq Composite Index has risen over the past year—indicating good times for the technology sector—Netscape's stock has been hit hard.



Sources: Nasdaq and Quote.com

close this deal, but I'm going to go home and have Christmas with my family, and we'll talk when I get back from vacation." That's why the business comes in the last week of the quarter.

But every year you face this same issue. This is the year that it dropped off. [Database maker] Oracle has seen a sudden slowdown as well. Does this indicate a general malaise in the industry? Are things slowing down

more and more complex to do interesting things. There certainly seems to be a growing saturation, for example, of the database market. And then you get other issues, like the Year 2000 problem, which is clearly a distraction for a lot of IT organizations.

Explain the advantages of SuiteSpot, your enterprise server software. It's an overall network infrastructure for running a large-

services, with advertising.

We use our Web site increasingly as a magnet for that, and we'll build that more into the client software than we've done [so far]. In a year, year and a half, when you download Communicator 7.0 or whatever, it's going to be much more of an integrated software and services offering. It'll present you with an integrated environment with news articles, stock tickers, sports scores, weather maps, all of your personal information, your e-mail, connections to fax and voice mail and pagers.

That shows you how you can pay over the long term to develop all this client software, even if you're not charging for it, because the flow of the money has

reversed. It's coming from businesses that want to reach all those individuals. The money is flowing downstream, instead of going upstream. You're not asking [them] to go out and pay for the software anymore.

How many visitors do you have on your Web site now? We have over two and a half million members on Netcenter now. These are registered members, who all have digital IDs issued from that center. We have their names, telephone numbers, e-mail addresses and all that. I think there are [more than 6] million visitors per day on the Netscape Web site. Then there are [more than] 65 million Navigator [and Communicator] users.

All those visitors come because the default "home page" of Navigator takes them to your site? Yeah. Absolutely. And the home page is only the beginning of it. You also have them linked in because of the menus and the buttons at the top on the tool bars. You can go to "Help" or "Software add-ons" or "Search" or whatever [and link to our site]. That will expand into a whole "Web-top" [as opposed to Microsoft's desktop] environment.

That new "Web-top" interface is what's known as Aurora? Explain that. Think of Aurora as a single shelf that contains all the different information that you're interested in. Today you have different access methods for each. If you want to go to a Web page you do one thing, if you want to read an e-mail message you do something else, if you want to [join] a discussion group or do research, you do something else. What Aurora does is put that all in a single hierarchy of information.

It also gives you the ability to, for example, have Web sites present tables of contents as part of that shelf. People can rearrange their shelves and put UPSIDE or whatever on that shelf. You can say, "Do a search to show me everything that's been updated since yesterday."

Is this the future of push technology, delivering information directly to people instead of making them search for it? Push has fallen out of favor. Right. Yeah. Push is a feature, not a product. It turned out that most of what people wanted to do with push technology, you could do with HTML and Java, so you can set up Web sites to do it. Microsoft is doing similar things.

Will this eliminate the need for push companies like PointCast? PointCast was a market aberration. It came out with a proprietary format that did a few things that HTML didn't, when HTML was still in the process of evolving in that direction. It's become clear that the content provider is not going to adopt a totally new proprietary format from Microsoft, PointCast or anyone.

The other problem with PointCast is it tried to pull an AOL. That is, it tried to get in between content providers and users, which shouldn't be necessary. I mean, it tried to wedge itself right in the middle there and make it only possible for you to reach users if you were willing to go

Netscape Communications Corp.

Headquarters: Mountain View, Calif.

Founded: April 1994

URL: <http://home.netscape.com>

Officers:

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James L. Barksdale, President and CEO

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Peter L.S. Currie, Chief Administrative Officer

Eric A. Hahn, Chief Technology Officer

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Roberta R. Katz, Senior Vice President, Secretary and General Counsel

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Marc L. Andreessen, Executive VP, Products

L. John Doerr, General Partner, Kleiner Perkins Caufield & Byers

John E. Warnock, Chairman and CEO, Adobe Systems Inc.

Eric A. Benhamou, Chairman, President and CEO, 3Com Corp.

Number of Employees: 3000+ [Before layoffs planned for Jan. 1998]

Main Business: Client and server software, commercial applications and development tools that link people over the Internet, intranets and extranets.

Ownership: Public

Chief Competition: Microsoft Corp., Lotus Development Corp., Oracle Corp.

Financial Summary: (in millions, except EPS)	Q3 97 (6/30/97)	CY 96 (12/31/96)	CY 95 (12/31/95)	CY 94 (12/31/94)
Revenue:	\$150.0	\$346.2	\$85.4	\$4.1
Pretax Margin:	11.5%	8.5%	-7.2%	NM
Net Profit, (Loss):	\$11.7	\$20.9	(\$6.6)	(\$13.8)
EPS, (Loss):	(\$0.13)	(\$0.24)	(\$0.09)	(\$0.21)

Exchange and Symbol: Nasdaq: NSCP

Stock Price: \$17.81 (1/14/98)

Shares Outstanding: 90,650,000

Market Valuation: \$1,614,476,500

52-Week Range: \$17-\$49.50

*NM-not material

through their service. Microsoft, on the other hand, builds all its own content and services and pushes that down to the user. We like to think that we present an opportunity for content providers who want to come through us to reach users. All the software we build makes it possible for content providers to reach users directly.

International Affairs

Are you being affected by the economic slowdown in Asia? A little, although the Asian business is such a small percent of our overall business right now that ... let's put it this way: It's not big enough for us to hide behind!

How are you doing overseas? We thought we'd have a bigger international component to our business by now than we do. We thought it would be 40 or 50 percent. It's under 20 percent.

Why haven't you been as successful there?

Part of it's been our execution. We haven't built a big enough or sophisticated enough enterprise software sales and service capability there.

Also, in Asia and Europe, the gap is widening [with the U.S.] for the adoption rates for technology. In a lot of cases these are companies that haven't fully adopted PCs yet.

Why do you think that is? U.S. companies all assume they need to put PCs on workers' desks, and they need to network them all together, and they need to build intranets. In Europe and Asia, they don't necessarily assume that. In many cases they don't seem to care.

They do seem to get quite excited about business-to-business links and business-to-consumer links. They seem to be getting excited about extranets and e-commerce between businesses. They do seem to be getting excited about Internet service provider opportunities, global telcos and so on. A lot of our business is related to that, as opposed to intranets. It'll be interesting to see how that plays out. You would imagine that, over time, if they're building electronic links to their partners and their customers, they would also do it internally. ■

Richard L. Brandt is editor of UPSIDE.

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Bullfight

Continued from page 86

plunged on Oct. 27 and the New York Stock Exchange closed early as trading halts went into effect for the first time in the Big Board's history. Investors were on an around-the-clock watch as markets melted down around the globe.

Another great year hung in the balance. Down in the canyons of Manhattan's financial district, lights burned through the night and the morning of Oct. 28 opened with another breathtaking dive. But somehow the market started bouncing back. A startling rally pushed stock prices sharply higher and the stock market looked like it would shrug off another jolt.

Technology stocks bore the brunt of the Asian crisis and limped to the end of the year. By Christmas, technology was no longer the leader of the pack.

After the Asian mess, stock prices rebounded slightly, without real conviction. Yet that meant 1997 still ended as a terrific year. Indeed, for all the tumult of the last two months of the year, the major averages recorded remarkably strong numbers: The Dow Jones Industrial Average gained 22.6 percent to 7908, and was just 4 percent off its '97 high of 8259. The S&P 500 gained 31 percent to 970. And even the Nasdaq Composite—home of much of the technology sector—rose 21 percent to 1570.

Wall Street Wealth

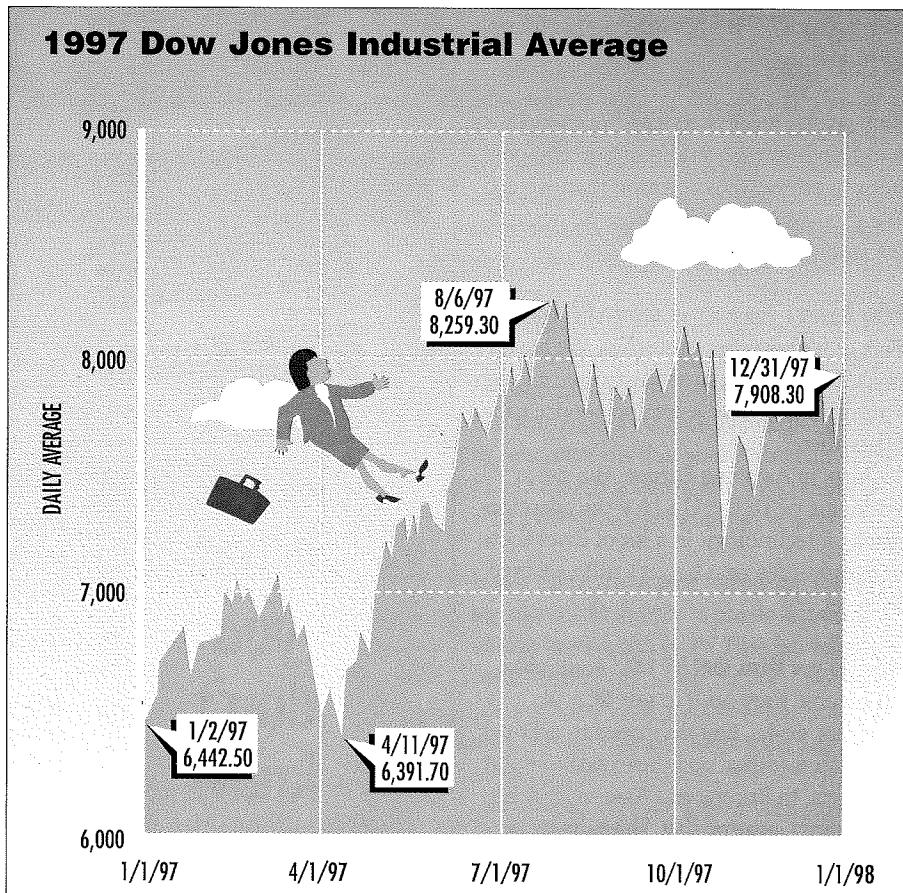
That solid year of performance helped drive more dough into the pockets of the investing world. Sure, individuals feel better about retirement accounts. But the real winners in this stupendous bull market have been on the inside: traders, brokers, bankers, venture capitalists and money managers. Fred Schwed's book, *Where Are the Customers' Yachts?* still resonates 50 years after its publication.

Those making less than a "7" on Wall Street (that would be a bonus of at least \$1 million) find themselves frustrated. In Manhattan, cigar shops rival delis for ubiquity, and swank eateries are carrying \$2,000 bottles of wine. Up in Boston, the fund management capital of the world, real estate prices are soaring. In Silicon Valley, the real estate boom climbed to new heights,

and brand new BMWs and sport utility vehicles provided eye candy while workers fought through the Valley's ever-growing traffic jams.

Yes, despite Wall Street's (and that would describe not just Manhattan, but the world of investing) best efforts to avoid the conspicuous consumption of the 1980s, the good times have lasted too damn long to keep these folks in check. Though firms don't kiss and tell, observers say Wall Street bonus checks for 1997 were on average 25

All of that wealth creation, however, has started to make Wall Street edgy. Despite the official bullish line about the long-term benefits of investing and the need to remain in the market, the firms closest to the action are not acting like the good times will continue forever. Consolidation has swept through the industry, and many Wall Street workers find themselves on the lowercase-s street. Morgan Stanley merged with Dean Witter. Salomon linked up with Smith Barney. Banks bought a rosterful of regional brokerage firms. Analysts find themselves chasing fewer chairs, as do



to 30 percent higher than in 1996—and in some cases the largest ever.

Investment pros are becoming celebrities, and the people who run the companies that have great stocks have become icons. Warren Buffett is the subject of countless best-selling books. Kent Logan, erstwhile big man at Montgomery Securities, became a feature piece in a *New York Times Magazine* story about new art collectors. Bill Gates competed with Bill Clinton for importance in the eyes of the world. Andy Grove became *Time* magazine's Man of the Year.

bankers and economists. It's a strange thing to see, this kind of reduction in job growth right in the teeth of a bull market.

And despite the flood of money into Silicon Valley, it feels like the place is showing, dare we say, signs of quaint agedness. The most glaring example of this is the tiring obsession with Apple Computer Inc. that befuddles those who have never even heard of Cupertino. This tiny company without a chance to succeed continues to hold the wisest of the technology wise in thrall. It's not unlike watching a car buff lust for defunct designs from Lotus. In the

meantime, almost no one seems to notice the warnings that such stalwarts as Intel and Seagate Technology Inc. may miss their quarterly expectations.

That doesn't mean that Silicon Valley is no longer the major hub for technology-minded companies and investors. Indeed, thrills about Valley tech companies helped propel the tech sector to a strange summer rally that wouldn't quit. And it's clear that the Internet has provided plenty of work for the tech-heads. But dreams of an everlasting tech rally have grown fuzzier.

Bear on the Prowl?

The combination of securities-industry angst and technology worries has many wondering about the bull market's durability. The "official" bull dates back to 1990, since stocks dropped the requisite 20 percent to count as a bear-market decline just before the Gulf War. Before that, there was the dramatic 1987 crash bear market. Nevertheless, self-described big thinkers argue that the bull market really began in 1982, and that the two downturns were merely temporary, although horrific, setbacks. That thinking says that we are now in the 15th year of the cycle, an aged bull market indeed.

Few are predicting a multiyear downturn yet. But it's also very clear that the stock market took more punishment than initially thought during its October rumble, and the mood has since soured on Wall Street. What had been a cool, calm, one-way bullish romp since early 1995 has now become a ferocious battle between bears and bulls. It's a battle that is likely to continue deep into 1998.

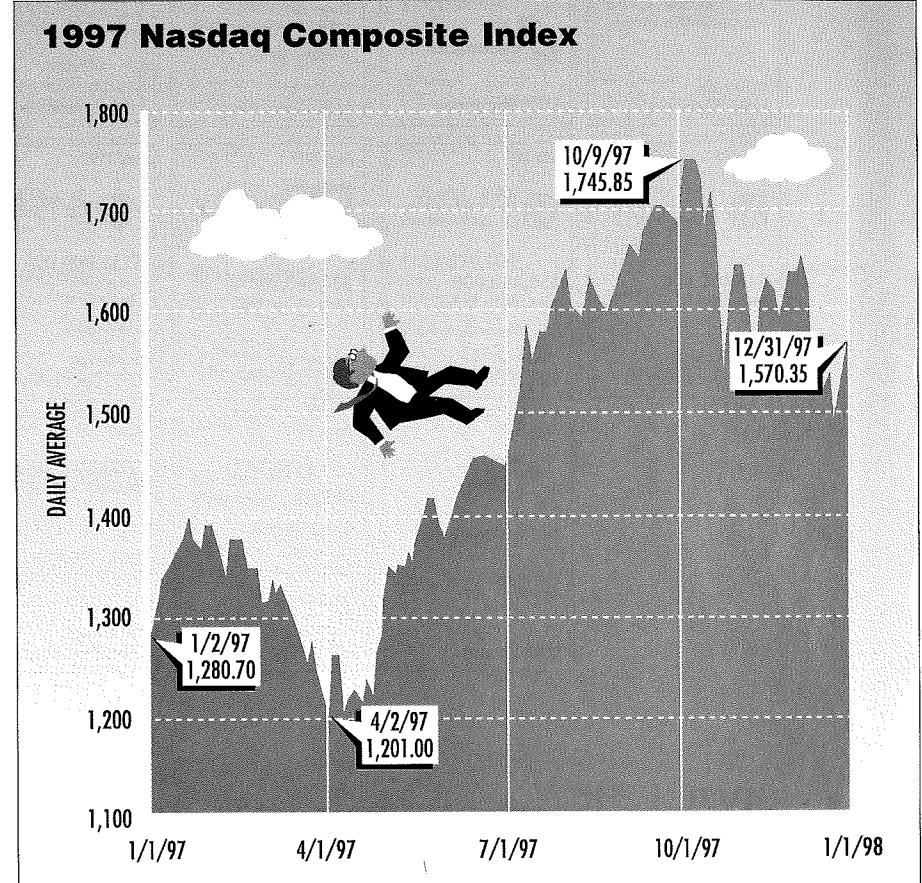
Many pundits argue that things will be OK. And why not? Since early 1995, when the Dow Jones Industrial Average first burst through 4000 (wow, that seems like a long way down from here), technology has paced the market higher. Investors on Wall Street have become overnight experts in networking equipment, operating systems and microprocessors. The difference between DRAMs and SRAMs is now important cocktail party conversation. Technology represents the surest way to play the U.S. economy's surest thing: the capital-for-labor substitution game. To cut costs, companies need computers doing more tasks previously done by people. As long as companies maintain capital spending patterns, the good times will roll. And the prob-

lems with Asia? Well, it's really a pretty small place in economic terms.

Don't be fooled. Already economists are clipping U.S. growth forecasts, citing the Asian problems. Among the emerging nations, Asia, with its enormous Chinese market, represented the most important and tantalizing piece of the international growth equation for tech. Given recent events, many companies and countries in this region will not be buying so many computers, routers and network systems in 1998. Capital spending programs have taken a major shot to the jaw with the Asian

Troubled Tech

I believe that this is so much fanciful thinking. Technology is still the key to stock market investing in 1998. Companies like Intel, Microsoft and Cisco will continue to set the tone. That makes the Asian situation all the more crucial for stock market investors. I always tell people to watch Intel. It is a company selling products into an economically sensitive portion of the technology sector. If Andy Grove can live up to his press clippings, the group should start to emerge later in 1998 as investors realize the U.S. economy



debacle, and technology stocks find themselves struggling to regain their footing.

That prompts the most important question of 1998: Can the stock market surge to new records without technology? With inflation tame and interest rates low, some argue that the financial stocks—the banks, insurance companies and securities firms—can help lead another leg of this fantastic market. Others argue that the low interest rates will propel steady growth stocks such as beverage makers and food concerns to higher valuations.

remains robust. But until then it could be tough sailing for the broader market, and technology stocks in particular.

So what to do as a TechLand devotee? Clearly, the shorter-term thinkers ought to avoid Asian linkage. Instead look for companies doing big business in Europe, especially Western Europe. Among those best situated: Microsoft, Hewlett-Packard Co. and Sun Microsystems Inc. For longer-term thinkers, now might be a great time to buy great companies with ailing stocks. If you believe the Internet still has many roads to pave, Cisco is a great bet no

Pending  Harmonic Lightwaves has agreed to acquire  NMC NEW MEDIA COMMUNICATION UBS Securities	December 1997  ACTIVISION. \$75,000,000 Convertible Subordinated Notes 144A Financing <i>Co-Manager</i> UBS Securities	December 1997  CONCENTRIC NETWORK CORPORATION \$150,000,000 Units Offering 144A Financing <i>Lead Manager</i> UBS Securities	December 1997  i2 Technologies \$139,500,000 Follow-On Offering <i>Co-Manager</i> UBS Securities	November 1997  ELCOTEQ NETWORK \$115,449,524 Initial Public Offering <i>Global Coordinator</i> UBS Limited	November 1997  Hybrid \$43,470,000 Initial Public Offering <i>Co-Manager</i> UBS Securities
October 1997  IMS International Manufacturing Services \$57,500,000 Initial Public Offering <i>Co-Manager</i> UBS Securities	October 1997  SINGLETRAC has been acquired by  G2 Interactive Software UBS Securities	October 1997  VERITAS \$100,000,000 Convertible Subordinated Notes 144A Financing <i>Sole Manager</i> UBS Securities	October 1997  Winbond Electronics Corp. \$100,000,000 Convertible Bond Offering <i>Co-Lead Manager</i> Union Bank of Switzerland	September 1997  COMPUTER HORIZONS CORP. \$106,500,000 Follow-On Offering <i>Co-Manager</i> UBS Securities	September 1997  FLEXTRONICS INTERNATIONAL \$89,300,000 Follow-On Offering <i>Co-Manager</i> UBS Securities
July 1997  CONCENTRIC NETWORK CORPORATION \$18,000,000 Private Equity Placement <i>Lead Manager</i> UBS Securities	July 1997  CONCENTRIC NETWORK CORPORATION \$59,340,000 Initial Public Offering <i>Lead Manager</i> UBS Securities	July 1997  Crystal Systems Solutions Ltd. \$37,260,000 Follow-On Offering <i>Lead Manager</i> UBS Securities	July 1997  GTS \$135,000,000 Going Public Convertible 144A Financing <i>Lead Manager</i> UBS Securities	July 1997  Micron <i>Shareholder Rights Plan</i> UBS Securities	June 1997  LG Electronics Inc. \$75,000,000 Exchangeable Bond Offering <i>Joint Global Coordinator</i> UBS (East Asia) Ltd.
May 1997  S3 Incorporated <i>Shareholder Rights Plan</i> UBS Securities	April 1997  LITE-ON TECHNOLOGY CORP. \$67,000,000 Convertible Bond Offering 144A Financing <i>Lead Manager</i> UBS (East Asia) Ltd.	April 1997  Peregrine SYSTEMS \$20,700,000 Initial Public Offering <i>Lead Manager</i> UBS Securities	March 1997  proxim <i>Shareholder Rights Plan</i> UBS Securities	February 1997  CFM Technologies, Inc. \$57,600,000 Follow-On Offering <i>Co-Manager</i> UBS Securities	

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November 1997 netopia* Strategic Advisory UBS Securities	November 1997 PRT \$59,800,000 Initial Public Offering Co-Manager UBS Securities	November 1997 TCG \$776,250,000 Follow-On Offering Co-Lead Manager, International Tranche UBS Limited	October 1997 AE ADVANCED ENERGY \$77,500,000 Follow-On Offering Lead Manager UBS Securities	October 1997 First International Computer \$220,000,000 Convertible Bond Offering 144A Financing Global Coordinator UBS (East Asia) Ltd.	October 1997 Industri-Matematik International \$162,725,000 Follow-On Offering Co-Manager UBS Securities
September 1997 INTERACTIVE has merged with DataWorks* UBS Securities	September 1997 IPEC \$100,000,000 Convertible Subordinated Notes 144A Financing Co-Manager UBS Securities	September 1997 PERVASIVE SOFTWARE \$46,000,000 Initial Public Offering Co-Manager UBS Securities	August 1997 BRIGHTPOINT, INC. \$150,000,000 Follow-On Offering Co-Manager UBS Securities	August 1997 CBSI COMPLETE BUSINESS SOLUTIONS INC. \$73,450,000 Follow-On Offering Co-Manager UBS Securities	August 1997 innova \$41,112,500 Initial Public Offering Lead Manager UBS Securities
June 1997 NEON \$38,088,000 Initial Public Offering Lead Manager UBS Securities	June 1997 POWERWAVE TECHNOLOGIES \$82,225,000 Follow-On Offering Co-Manager UBS Securities	June 1997 DATA \$38,000,000 Initial Public Offering Co-Manager UBS Securities	June 1997 XEROX \$250,000,000 Exchangeable Equity-Linked Notes Sole Manager UBS Securities	May 1997 ASUS ASUSTeK Computer Inc. \$235,830,000 Global Depository Receipts Joint Global Coordinator Union Bank of Switzerland	May 1997 INFOGRAMES Strategic Advisory UBS Securities
February 1997 DELTA Delta Electronics, Inc. 台达电子工业股份有限公司 \$110,000,000 Convertible Bond Offering Global Coordinator UBS (East Asia) Ltd.	February 1997 S&P \$510,000,000 Accelerated Global Tender Joint Global Coordinator UBS Limited	February 1997 Virgin INTERACTIVE entertainment Strategic Advisory UBS Securities	January 1997 Electronic Retailing Systems \$147,000,000 Senior Discount Notes Co-Manager UBS Securities		

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If you want to gamble on tech stocks in 1998, try Internet companies. They're likely to continue to feast on Wall Street expectations.

matter how raw it's outlook may become in the next 12 months. And do you doubt that Gates will find a way to handle the Department of Justice?

One area of the technology market that will receive increasingly intense scrutiny from investors is the Year 2000 sector. Many on Wall Street expected this whole group to wither away as large companies arrived at silver-bullet solutions. Now it seems less likely that such a scenario will occur.

What will happen when the computers turn over to '00? Will the entire digital world shudder? Or will the Year 2000 companies receive bigger and bigger contracts to stave off techno-disaster? I talked briefly with the head of a small window-making company in Minnesota late in 1997. He

hardly knew what a browser was, but he did know one thing: he had to get his Year-2000 problem fixed, and he did so. As more companies make the move to fix their exposure to the Year 2000 fiasco, these stocks will become a volatile, exciting sector.

If you want to gamble on tech stocks in 1998, try Internet companies. They're likely to continue to feast on Wall Street expectations. The fantasy of hitting a winner in the wired world has helped drive stocks like Amazon.com Inc. and Yahoo Inc. to dizzying heights. The gains for Internet stocks last year—at least the hot ones—were incredible. Yahoo gained 511 percent in 1997 and Amazon.com, which went public for \$18 a share on May 15, soared 234 percent. The still-young industry could create more exciting stories in 1998.

Investors salivate at the possibilities presented by the Internet: It's not too expensive to get started in the industry, and successful companies immediately have a global reach. (Of course, they neglect the fact that the market is crammed with treasure hunters, making success all the tougher.)

Yet most pundits believe that initial public offerings, the source of much entrepreneurial wealth, will suffer in early 1998, especially among so-called concept offerings that have little more than a clever business plan and an enticing story line (see sidebar, page 86).

Finally, a troubling sidelight to the technology group's activity last year came from some unexpected securities industry moves. Staid, large banks acquired Montgomery Securities and Robertson Stephens & Co. At year's end, Hambrecht & Quist LLC barely hung onto its independence, tempted by the big bucks of suitor Merrill Lynch. These sales mark the end of an era. The San Francisco securities firms grew with the technology explosion, using a swashbuckling style to jam ideas into reality.

How can that be the same with big old commercial banks running the show? In time, other smallish banks will emerge, but it is not heartening to see someone like Montgomery's boss, Tom Weisel, decide that he's had a pretty good run and now it's time to sell the firm. Partners at Montgomery got a cool \$15 million each for the sale; Weisel certainly received more. But would he have cashed in if he saw a few more Intels or Ciscos emerging from the Valley?

No question it's a tougher road ahead for the market and for technology. Instead of worrying about the next chip plant or networking idea, why not have a Coke and a smile? That drink will never go out of style. ■

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The Asian Crisis

BY DAVID E. SANGER

Who is to blame for Asia's astounding fall from booming prosperity, an event that seems bound to haunt the American economy for all of 1998 and perhaps beyond?

Certainly the leaders of Asia, convinced that their fate was to run the world's most dynamic economies, contributed the key ingredients to economic disaster. Year after year they kept mixing a deadly financial cocktail: pushing local banks to loan millions of dollars to their favorite projects, turning a blind eye to rampant corruption, luring a seemingly endless flow of cheap capital from abroad, and pressing industry to gain market share for cars, chips and electronics at any cost.

From Bangkok to Seoul, capitals were wildly overbuilt with gleaming office towers, monuments to new wealth. And just beyond the city limits rose the symbols of 21st century power—new semiconductor fabs and auto factories. It became a construction game of one-upmanship: If Thailand had it, Indonesia needed it. But once the bubble burst, the damage went far beyond the Pacific.

Brace yourself: It won't end anytime soon. The countries that have been bailed out by the International Monetary Fund (IMF)—Thailand, Indonesia and South Korea—have all agreed to sharp austerity plans that have already sent interest rates soaring and brought growth nearly to a halt.

continued on page 124



ILLUSTRATION BY RICHARD MERCHÁN

MARCH 1998 UPSIDE 121

Knowledge, creativity,

adaptec \$230,000,000 4.75% Convertible Subordinated Notes due 2004 January 1997	HMT \$230,000,000 5.75% Convertible Subordinated Notes due 2004 January 1997	MICROCHIP \$50,025,000 Follow-On Offering January 1997	intevac \$57,500,000 6.50% Convertible Subordinated Notes due 2004 February 1997	IONA \$158,290,830 Follow-On Offering February 1997	MICRON \$263,925,000 Follow-On Offering February 1997
VISIGENIC \$19,600,000 Follow-On Offering February 1997	Logitech \$36,800,000 Follow-On Offering March 1997	NEO MAGIC \$41,400,000 Initial Public Offering March 1997	SPL \$4,000,000 Private Placement March 1997	EXCELCORER \$24,361,000 Follow-On Offering March 1997	Adaptec Inc. \$26,910,000 Initial Public Offering April 1997
3D-A \$32,235,798 Initial Public Offering April 1997	AirNet \$8,900,000 Private Placement May 1997	3Dfx \$70,437,500 Follow-On Offering May 1997	InVision Technologies \$37,950,000 Follow-On Offering May 1997	IHS \$88,320,000 Initial Public Offering May 1997	LogicVision \$17,700,000 Private Placement May 1997
PHOTONICS \$103,500,000 6.00% Convertible Subordinated Notes due 2004 May 1997	teledata \$82,524,000 Follow-On Offering May 1997	RAMBUS \$37,950,000 Initial Public Offering May 1997	3Dfx \$37,950,000 Initial Public Offering June 1997	CANDESCENT \$56,700,000 Private Placement June 1997	D. SOLOMON'S \$108,477,751 Follow-On Offering June 1997
GENESYS \$51,750,000 Initial Public Offering June 1997	HADCO \$150,434,375 Follow-On Offering June 1997	MELITA \$40,250,000 Initial Public Offering June 1997	MICRON \$500,000,000 7.00% Convertible Subordinated Notes due 2004 June 1997	Premiere \$172,500,000 5.75% Convertible Subordinated Notes due 2004 June 1997	3Dfx \$350,000,000 Zero Coupon CrEDITS due 2002 June 1997
Pynetics \$5,000,000 Private Placement June 1997	Galileo \$58,650,000 Initial Public Offering July 1997	Harbinger \$102,551,250 Follow-On Offering July 1997	IMA \$50,700,000 Initial Public Offering July 1997	tsi soft \$41,400,000 Initial Public Offering July 1997	3D-A \$117,300,000 Follow-On Offering July 1997
SYLVAN LEARNING SYSTEMS, INC. \$215,625,000 Follow-On Offering August 1997	HMT \$145,000,000 Follow-On Offering August 1997	LEVEL ONE \$115,000,000 4.00% Convertible Subordinated Notes due 2004 August 1997	Manugistics \$89,585,000 Follow-On Offering August 1997	OMTOOL \$41,400,000 Initial Public Offering August 1997	

power

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E*TRADE \$256,162,500 Follow-On Offering August 1997	Vantive \$69,000,000 4.75% Convertible Subordinated Notes due 2002 August 1997	POSITION FIBER SYSTEMS \$35,310,000 Initial Public Offering August 1997	QAD \$99,187,500 Initial Public Offering August 1997	SYNTEL \$37,950,000 Initial Public Offering August 1997	TECNOMATIX \$97,750,000 5.25% Convertible Subordinated Notes due 2004 August 1997
CYPRESS SEMICONDUCTOR \$200,000,000 6.00% Convertible Subordinated Notes due 2002 September 1997	GN Great Nordic \$112,672,548 Follow-On Offering September 1997	JDEdwards \$417,910,000 Initial Public Offering September 1997	LERNOUT & HAUSPIE SPEECH PRODUCTS \$108,000,000 Follow-On Offering September 1997	PERVASIVE SOFTWARE \$45,000,000 Initial Public Offering September 1997	POWER-ONE \$80,500,000 Initial Public Offering September 1997
ProBusiness \$31,625,000 Initial Public Offering September 1997	TERAYON HOLDINGS INC. \$12,300,000 Private Placement September 1997	TEL-SAVE HOLDINGS INC. \$250,000,000 4.50% Convertible Subordinated Notes due 2002 September 1997	SSS \$6,500,000 Private Placement October 1997	ADVANCED ENERGY \$77,500,000 Follow-On Offering October 1997	CONCORD \$46,690,000 Initial Public Offering October 1997
JUSTSYSTEM \$21,000,000 144A Common Stock Offering October 1997	Melexis \$65,700,000 Initial Public Offering October 1997	OBJECTIVE CORPORATION \$23,125,000 Follow-On Offering October 1997	PSI \$56,632,500 Initial Public Offering October 1997	OMEGA RESEARCH \$43,175,000 Initial Public Offering October 1997	ONSALE \$64,975,000 Follow-On Offering October 1997
FAROUDJA \$20,700,000 Initial Public Offering October 1997	TELETRONICS \$297,360,000 Follow-On Offering October 1997	SecurityDynamics \$136,275,000 Follow-On Offering October 1997	AMCC \$51,087,600 Initial Public Offering November 1997	olicom \$57,903,411 Initial Public Offering on Copenhagen Stock Exchange November 1997	PICOM \$100,000,000 4.25% Convertible Subordinated Notes due 2002 November 1997
PEAK \$55,000,000 Follow-On Offering November 1997	RealNetworks \$43,125,000 Initial Public Offering November 1997	Sandisk \$84,000,000 Follow-On Offering November 1997	SOFTWARE AG AMERICAS \$88,550,000 Initial Public Offering November 1997	SportsLine \$32,200,000 Initial Public Offering November 1997	WAYFARE \$2,500,000 Strategic Placement November 1997
ICOS \$9,300,000 Private Placement December 1997	INFORMATION ADVANTAGE \$25,875,000 Initial Public Offering December 1997	POWER INTEGRATIONS INC. \$20,004,000 Initial Public Offering December 1997	POWER INTEGRATIONS INC. \$32,000,000 Initial Public Offering December 1997	intertainer \$2,200,000 Strategic Placement December 1997	

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Asian Crisis

Continued from page 121

Tech Pain, Tech Gain

Tech firms will see upsets and opportunities from Asia's economic woes. American-made goods that are priced in dollars are suddenly twice as expensive as they were a year ago. Sales to Asia will plummet, shrinking profits. Oracle Corp.'s stock dropped dramatically in December after the firm blamed Asia's turmoil for a disappointing quarter. More such surprises are ahead.

There is little doubt that economic growth in the United States and Europe will be reduced this year because of the Asian crisis. The only question is, how much. After all, while Asia accounts for only a quarter of the world's economy, it has been responsible for half of the growth in world production.

Of course, economic crises also create enormous opportunities, and this one is no exception. American companies that manufacture in Asia are suddenly enjoying a huge windfall. When local currencies devalue against the dollar, local costs—from salaries to buying new facilities—decline dramatically. In dollar terms, the wages that chipmakers pay to Malaysian workers, who package semiconductors in their ceramic casings or put together disk drives and other components, have just declined 50 or 60 percent.

Perhaps more importantly, manufacturing plants and distribution networks put together by overambitious firms, especially in South Korea, are expected to be sold for fire sale prices, as Korean banks are forced to liquidate their bad loans. After years of complaining about barriers to getting into the market, this may be one of the greatest buying opportunities in Asia in more than a decade.

As part of its \$57 billion bailout agreement with the IMF, South Korea was forced to lift many of its prohibitions against foreign takeovers of local firms. "The only question," says one senior American trade official in Washington, "is whether American firms are savvy enough to snap these up at a time when the Japanese, the Koreans and others are being forced to open their markets to investment."

Over the longer term, there is another

benefit for U.S. technology companies. There is little risk that Asia's giants, from Samsung to Toshiba, will be spending vast sums on research and development in the near future. In the early 1990s that seemed like a very real threat, and Washington was assembling reports showing what would happen when Asian R&D labs swung into high gear.

How Did This Happen?

If American firms now face Asian troubles and opportunities, it is in part because they also contributed to Asia's problems—often in the way a bartender contributes to drunk driving. While Asian entrepreneurs were mixing the drinks, there is no question who was supplying the booze: Wall Street and lenders in Japan and Europe. Throughout the 1990s, Asia's emerging markets—particularly China, Taiwan and many of the nations of Southeast Asia—

The numbers themselves are astounding. During the boom years of the 1990s South Korean companies borrowed roughly \$120 billion from banks and financial institutions overseas. Thailand borrowed \$79 billion and China \$71 billion. Malaysia—which had grand hopes of building a Southeast Asian Silicon Valley as soon as it finished the world's tallest twin towers (completed just before the crisis began)—borrowed \$63 billion. Most of it came from Japan and Europe, but a good chunk came from the United States.

As long as Asia kept up its phenomenal growth rates, these were low-risk investments. After all, Asia's greatest strength lies in the mixture of a talented work force in countries with relatively low budget deficits and little debt. Most of them had long maintained policies of linking the value of their currencies to the value of the dollar. It seemed unlikely that they would have a hard time repaying their borrowings.

Bankers and investors lumped all Asian nations together—the healthy and the troubled, the clean and the corrupt.

rose in the American mind as a bottomless source of demand.

You could sense it during an evening stroll through the streets of Jakarta or even Hanoi: An emerging middle class there was already smitten with Hollywood and country music; now their appetite would be driven to buy anything that ran Windows and used the latest Pentium processor. That was all the lenders of the world had to hear. For years they loaned billions to the region without asking the questions any good venture capitalist would before sinking money into a startup.

"People forgot about risk," one longtime investment banker in Hong Kong ruminated recently. "They thought that lending to large South Korean conglomerates or investing in a new factory in Malaysia was the same as buying bonds from a sovereign government." And they lumped all Asian nations together—the healthy and the troubled, the clean and the corrupt.

But investing in ancient nations has something in common with investing in new technologies: The big risk lies in the competitive surprises no one sees coming down the road. And in Asia, there were plenty.

As the value of the dollar rose over the past two years, so did the price of exports from countries that linked their currencies to the greenback. Suddenly Korean cars and Thai clothing, for example, became a lot more expensive to produce than similar goods in China where many American and Japanese manufacturers were also leasing factories. But that did not stop the Koreans from building the capacity to produce 5 million cars a year (10 times the size of the domestic market for cars in Korea), or the Thais from building gleaming new office towers that stood empty. And it did not stop the West from lending more and more money. After all, these were the great emerging markets of the next millennium, right?

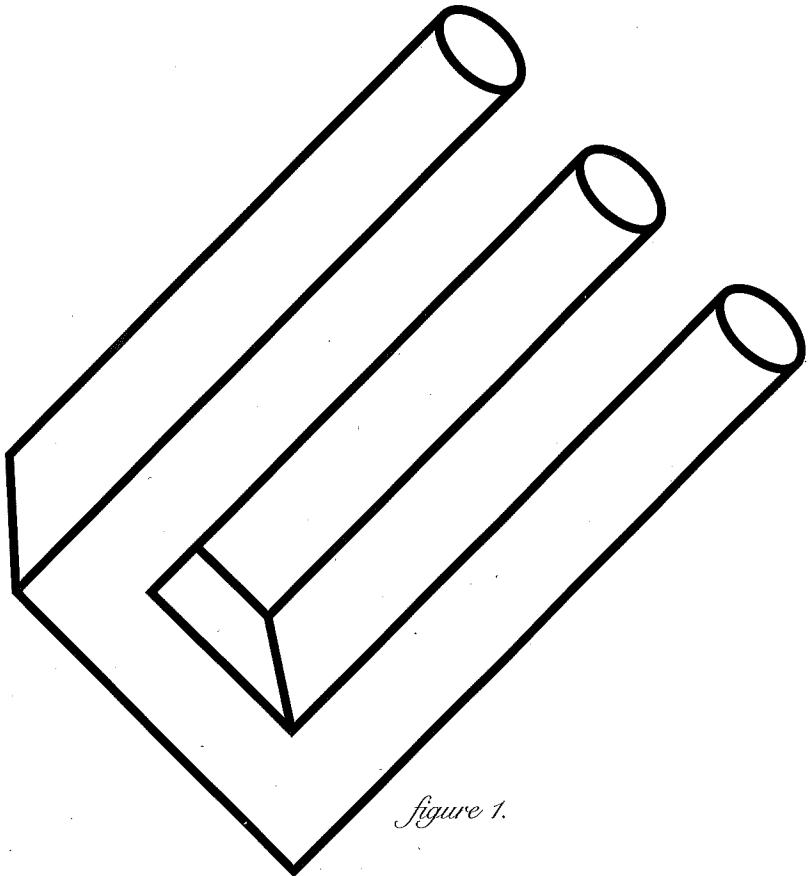


figure 1.

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When the bubble began to burst last summer, it soon turned into a classic market panic.

When the bubble began to burst last summer, it soon turned into a classic market panic. Currency speculators dumped Thai baht, Indonesian rupiah and South Korean won, and governments wasted billions of dollars in foreign currency reserves desperately fighting them off, hoping to maintain the link between their own currencies and the dollar. They failed. Without government backing, the currencies plummeted, some by 70 percent or more. Suddenly, local banks and manufacturers, which make money in local currency but have to pay back their debt in dollars, discovered that their foreign debt had soared just as their businesses were grinding to a halt. A small string of bankruptcies turned into a gusher. As the prospect of broader defaults rose, investors cleared out of town, and the IMF was called

in to arrange bailouts in three nations.

Why did no one see this coming? One reason, perhaps, is that investors—especially American investors—were so focused on individual deals that they blinded themselves to business and political realities. "The great mystery still lingering in the background of the Korean crisis is why Western banks made such large loans to Korean enterprises," David Hale, the chief economist of the Zurich Insurance Group, noted recently. One answer is that they often loaned the money to local banks, which then parceled it out to local businesses. The American lender, in short, did not know the final borrower.

The risk was underestimated because investors came to believe that Asian industry had become too big to fail. Here they may have been right. After hesitating to leap

into the business of foreign bailouts, the United States rushed to save Korea from itself—not out of altruism, but out of fear of what would happen if the contagion spread.

The problem is that such bailouts send the wrong message: Investors—particularly foreign investors—come to expect that governments will always save them from their own folly. At worst, they might lose 10 percent or 20 percent, but if national default looms, they can count on the IMF or the world's biggest economies to provide the cash to ensure they won't lose everything. That squeezes a lot of the risk out of the system and encourages more bad judgments of the kind that sent Asia to the brink. ■

David E. Sanger is the leader of the economic unit in the Washington bureau of the New York Times, where he has served since October 1994.



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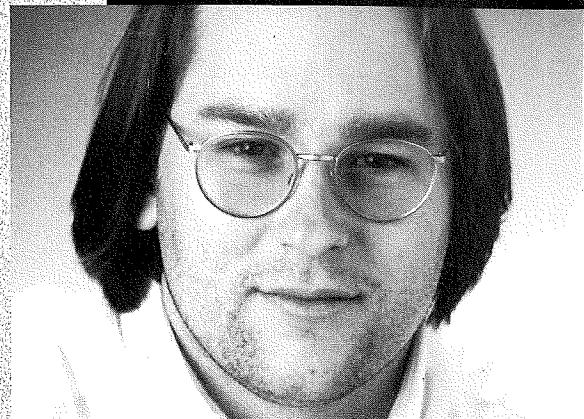
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Client Profile



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ANDREW BUSEY

*Founder, Chairman & Chief Technology Officer
iChat, Inc.*

Andrew Busey is ahead of the game. Four years ago and fresh out of Duke University, Andrew had the idea of creating technology which would make real-time communications on the Internet as user friendly as a chat room on AOL.

Today, iChat's client-server technology is changing the way businesses and consumers communicate and collaborate. iChat's software allows users of the World Wide Web and corporate Intranets to chat, send instant messages, post bulletins, and conduct serious on-line conferences.

Businesses are using iChat's technology to exchange ideas quickly and efficiently, whether between customers and company representatives or among large internal groups working on a shared project.

On the Web, affinity groups using iChat's technology are building community, awareness and understanding between users. In doing so, iChat's customers are creating informative sites with current industry news, outlook and trends.

In short, iChat is bridging the gap between e-mail and the phone in real-time.

Andrew Busey on Brobeck:

"I was 22 when I first pitched my idea to the venture capital community. At that time, there wasn't really a tradition of young Internet entrepreneurs being successful, as the market was very young. Brobeck's track record in working with entrepreneurs is exceptional. Brobeck provided us with introductions to the VC community and helped me secure the funding to get iChat started."

Diary

Continued from page 92

This was a signal to me that either this VC world is cutthroat or Vince is reaching too far for business, or both.

As they shake hands, Ritter has already written Woodside out of the script:

Aug. 8, 1995 (cont.): The Internet space is on fire, especially given the Netscape IPO, and we have a product and history as a team that is unusual and in demand. After the meeting, instead of being more interested in working with Vince and Woodside, I knew we could bag a bigger and higher-profile VC.

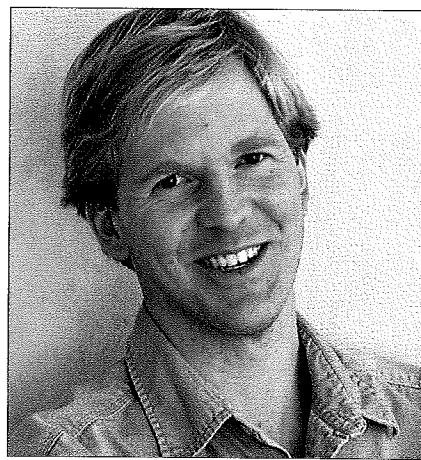
A Little Lawyerly Advice

Ritter realizes that if they're going to get into bed with what he starts calling "the gold-standard VCs," they had better get some solid legal advice to protect Tribe's booty. He fishes out the name Archambeau gave him and dials up Josh Pickus, who agrees to meet at a small café on Russian Hill in San Francisco. Pickus brings his partner, Jim Brock, to help eyeball the entrepreneurs.

Aug. 23, 1995: Canh and I meet them at the Petite Café. I like Josh immediately. I rowed heavyweight crew at Princeton, and Josh was a coxswain [the steersman who directs the rowers]. This is a key bond. Josh gives us sound advice.

He suggests they sell Tribe so there's no "baggage" bogging down a VC deal for Whistle, the new company based on InterJet. And Pickus says he has good insight into which VCs are looking to finance Internet startups.

It never seems to cross Ritter's mind that the attorneys might reject them as clients, a two-bit startup not worth their \$335-an-hour time. The cocky novices see nothing odd about grilling Sand Hill Road veterans Pickus and Brock about their qualifications to handle the deal. Ritter's notes show his arrogance and audacity:



Gordon Ritter

Aug. 23, 1995 (cont.): We know we have something exciting for them. Not only are we about to move our venture idea into the big leagues, where they like to play, but there is going to be lots of legal work.

Pickus laughs at the memory of this first meeting: "It was funny. I had cheesecake for two and a half hours as they dissected me. Remember, these guys have never experienced anything in their lives but success. Their attitude was, 'We're going to interview the shit out of you because to work with us is an incredible opportunity.'" He chuckles, recalling, "They didn't have the money to pay me or anything."

Why didn't Pickus put them in their place? "I loved the challenge," he says. And he actually found their inflated egos a major selling point for the company. "In their minds, this was the beginning of the formation of this billion-dollar enterprise. That's part of what it takes to be an entrepreneur, to believe in things that, on any rational basis, are absurd."

Ritter walks away sold on Pickus. He'll serve as more than just a lawyer. He's the connection Ritter has been searching for; gold-standard VCs count on attorneys like Pickus to send deals their way.

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Ask The Professional



Executive Search

Q. Is there a way of retaining a search firm to be guaranteed of obtaining positive results?

A. Yes, simply by staying intimately involved in the entire process. The search process is a team effort. The team includes the search executive, the potential candidate(s), and most importantly, you as the client. The planning stage of developing a research strategy and a position specification is crucial. Equally critical is the crisp executive of the process, including your availability to interview, scheduled appointments being kept, timely feedback and follow through on candidates being provided. Continued commitment of your time to the search firm and to the candidates they present is the ultimate way to ensure positive results. The alternative may result in unsatisfactory or unfinished work.

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Venture Capital

Q. How has the volatility of the stock market in the fall of 1997 affected venture capital investment? And what other countries besides the US are on the radar screens of US venture capitalists?

A. Because venture capitalists take a long-term investing approach, expecting to see returns in two-to-five years when the companies they invest in go public, the current volatility in the stock market should have little short-term effect on their investment decisions.

Outside of the US, Israel has been receiving more US venture-backed financing than any other country in the world.

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Diary

By mid-September, Pickus, Ritter and Li hold their first strategy meeting. Pickus advises them to draw up two lists of targeted VCs—the first are top-tier VCs, the second are those with Internet experience. Pickus suggests they preserve a sense of exclusivity by talking with just two or three of the VCs to begin with. "Get a hot deal buzzing," he urges the entrepreneurs. Pickus' No. 1 choice: Yogen Dalal at Mayfield Fund, a rock-solid, top-tier VC. Pickus tells Ritter, "Yogen could be a fit. He has missed a few hot deals and is looking for a winner."

Pickus is pushing Dalal for another reason, too. "These guys are young," he explains. "It's clear to me it isn't going to be a smooth path to success. They need investors with a light touch and patience." In a valley where VCs have a reputation as vultures, Pickus considers Dalal one of the "nice guys."

Geek-Speak

A week later, our heroes get a reality check. They learn they aren't quite the hot shit they'd imagined. The jolt comes as they work on honing their pitch to the VCs with Pickus' boss, Craig Johnson, a founding partner of VLG. Johnson plays the role of "the guy on the street." He finds their technospeak spiel so confusing he can't understand the key services InterJet offers.

Sept. 2, 1995: This was the first meeting where we realized we hadn't invented the perpetual-motion machine just yet. We had been speaking to hungry VCs who weren't digging hard [for information]. For the big leagues, Craig advised, we'd better tighten our message.

Ritter continues to shop for gold-standard VCs who are Internet savvy. A friend

tells him about Geoff Yang, a Young Turk who's quickly making his name in Internet deals at Institutional Venture Partners.

One week later, on Oct. 2, Ritter rolls the dice and mails a rough business plan to four VC giants: Yang at IVP, Dalal at Mayfield, Tench Coxe at Sutter Hill Ventures and Doug Carlisle at Menlo Ventures.

It lands with a dull thud at Menlo Ventures and Sutter Hill. Carlisle grants them a meeting, but, Ritter recalls, "he didn't get why we were different from a router. We never had a second meeting." Ditto for Coxe.

Then a friend wrangles them an audience with the legendary Arthur Rock, the VC who helped launch Intel Corp. Ritter drolly recalls, "He may have dozed off during the meeting. Not his kind of deal."

With three VCs down, Ritter's dreams of the billion-dollar enterprise now hinge on Dalal and Yang. Both men have agreed to hear Whistle's pitch on Oct. 24th. The Yang meeting is at 9 a.m., followed by Dalal at 11 a.m. Their homework on the VCs tells them Yang is a strategist who looks for the next high-tech boom, while Dalal is more of a techie who will likely be enticed by the product.

Ritter pulls the Accord into IVP's parking lot, among the battery of BMWs and Mercedes Benzes, and pumps himself up by repeating over and over, "Venture capitalists need smart entrepreneurs with great ideas like us as much as we need them." He and Li stride through the heavy wood-and-glass doors, which reek of money, and learn that Yang is running late—a perpetual state for Yang, who works 12-hour days trying to find the winning deals among the hundreds of e-mails, phone calls and faxes he receives each year from entrepreneurs. (In April 1995, Yang invested \$2 million in a struggling Internet search engine. Today, his investment in Excite Inc. is worth \$57 million.)

Ritter and Li are among the lucky 300 who've made it through the first cut and won a meeting with Yang. He finally arrives and gathers the founders around a small wooden table in his office. Li runs through his presentation, and Ritter boasts that InterJet, still in a crude demo stage, will unlock a \$200 million market for small businesses. It's a brave claim—especially considering that on this day in 1995, the Internet is in its infancy, and no one is sure small businesses will want to use it.

Ask The Attorney

Securities



Stephen D. Cooke
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Janofsky &
Walker LLP
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sdcooke@phjw.com
www.phjw.com

Q. My company plans to file a registration statement, but I doubt whether the public offering can be completed before we must raise additional financing. Should I be worried?

A. Yes, the SEC's position is that the filing of a registration statement is tantamount to a general solicitation of securities. Under the SEC's view, any private offering occurring within six months after the termination of a registration statement may be tainted unless you can change the nature of the offering to avoid integrating it with the registered offering. You could try offshore investors.

Intellectual Property

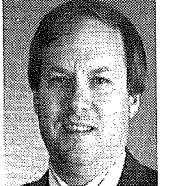


M. Peter Adler
Oppenheimer
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Donnelly LLP
Washington, DC
202/293-6300
padler@owdlaw.com
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Q. My company has entered into a collaborative effort with a foreign company to develop some highly sensitive products. We have taken the appropriate steps to protect our intellectual property. Are there other things we should consider?

A. The release of information to foreign nationals may be an *export of technical data*, requiring a license under the Export Administration Regulations of the Department of Commerce (dual use) or the International Traffic in Arms Regulations of the Department of State (defense). Failure to obtain necessary licensing may result in criminal or civil penalties.

Venture Financing



**William B.
Asher, Jr.**
Testa, Hurwitz
& Thibeault
Boston
617/248-7000

Q. How much equity should be set aside for employee stock options following the completion of a venture financing?

A. Venture investors generally agree to a *carve out* of 10% to 15% of the fully converted equity for employee stock options. The exact percentage will depend upon the company's anticipated hiring needs over a 2-to-3 year period; e.g., is there a need to attract experienced senior management via significant equity incentives? The option pool can be replenished later if the company's growth justifies an increase. The option pool should be a key negotiating point with investors, as it may significantly affect investors' projected rate of return.

Multimedia Software



Gordon T. Yamate
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Doyle, Brown &
Enersen
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415/393-2000
gyamate@mdbe.com
www.mcculchen.com

Q. What are multimedia software companies currently doing to attract highly-talented employees to develop content-driven programs?

A. These companies are more likely to reward employees who are the principal authors/developers of the new software titles by paying them royalties based upon sales of that title, in addition to allowing them to participate in the company's stock option or other incentive stock plans. These employees are also more often concerned with individual attribution to works created by them and may well demand the ability to control development of sequels, etc.

Minority Owners



Robert S. Baird
Vinson & Elkins
Austin
512/495-8451
rbaird@velaw.com

Q. When a company acquires a controlling interest in another entity in a similar line of business, what duties will it have to the minority owners?

A. Under the business opportunity doctrine, generally a controlling person cannot pursue a business opportunity that is in the line of business of a controlled entity unless the controlled entity first declines to pursue it. The duties of the majority owner should be defined explicitly in the acquisition documents, and it may be advisable to narrow the purpose clause in the acquired entity's charter or other governing document.

Patent Litigation



**J. William
Wigert**
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Roach & May
San Francisco
415/659-5903
wwigert@
chrm.com
www.chrm.com

Q. When should I start worrying if a product I am about to introduce infringes somebody else's patents?

A. Right away. Anyone who makes, sells, buys or imports products is liable for patent infringement even if you don't know about the existence of a patent that you are infringing. If you've been put on notice by the patentee, the situation is even worse. You can be liable up to three times the patentee's actual damages and attorneys fees. Before you introduce a product into the marketplace, consult a patent attorney. This will give you the opportunity to *design around*, or seek licenses under, troublesome patents.

Insurance



**John L.
Antracoli**
Bergeson,
Eliopoulos,
Grady & Gray
San Jose
408/291-6200

Q. In a lawsuit against my company, some claims are covered by our CGL policy and others are not. Must the insurer pay for all defense costs as they are incurred during the litigation?

A. Yes. The insurer must pay for all defense costs as they are incurred. However, the insurer later can seek reimbursement for defense costs which are *solely* attributable to the defense of noncovered claims. It is the insurer who must prove which costs are to be reimbursed, and in most cases where the claims have common facts, the insurer will have difficulty meeting its burden.

Software



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sorindj@bipc.com
www.bipc.com

Q. What issues should our company be considering if we're approached by a software company who wants to market their product in conjunction with our services?

A. Focus on the rights of the software company that allow you to market and use their product. Make sure that they are either the owner or lawful licensor of the software and that they have the right to allow you to market and provide services for their product. Your agreement with the software company should include indemnification for any damages arising from marketing or use of the software by you or your customers.

Domain Name



**Peter M. Watt-
Morse**
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Q. Does a domain name registration protect my trademark?

A. No. A domain name registration provides exclusive rights to an Internet address, not a trademark. In the United States, trademark protection is obtained through registration with the United States Patent and Trademark Office and actual use of the mark in conjunction with your goods or services. However, domain name registration of an existing trademark can be useful to prevent actual confusion in the marketplace.

Diary

Name-Dropping

Oct. 24, 1995: Geoff Yang said he got five calls this week about this deal. [Ritter admits to orchestrating this barrage of calls from friends at impressive financial institutions, including Alex. Brown & Sons and Morgan Stanley.] "I wanted to make sure our deal rose up from others in terms of our existing relationships. I knew these guys care about who you know." Geoff asked a few questions but was mostly looking at me and Jim to see who we were as people.

On the other side of the table, Yang is puzzling over the entrepreneurs' unusual credentials. He remembers thinking, "These guys aren't out of industrial or university labs. They're from Wall Street." But Yang is impressed with the InterJet concept and struck by Ritter and Li's drive and determination. Yang promises to begin some due diligence on the company and InterJet's viability.

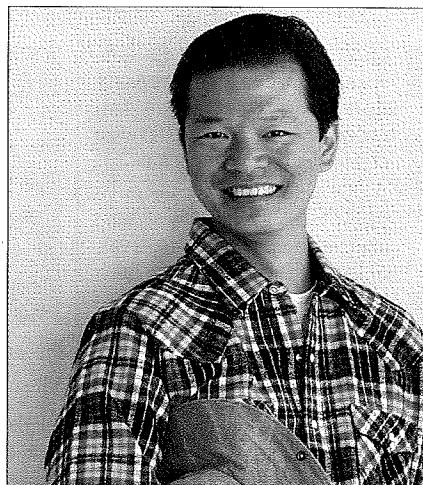
Two hours later, half a mile down Sand Hill Road, Ritter and Li repeat their performance before Yogen Dalal at Mayfield. Pickus has paved the way. It doesn't hurt that Pickus' law firm is just downstairs from Mayfield.

Oct. 24, 1995 (cont.): Yogen was positive from the first minute of the meeting. It seems as though he already knows he wants this one. Josh had talked with Yogen about us and given a strong endorsement. Yogen immediately was in a selling-Mayfield mode. ... No other [top-tier] VC has

done this at the first meeting. This is a good sign.

The meeting ends with Dalal asking to visit the company—a good sign indeed. So good that Ritter decides it's time to play the next card in his poker game with the VCs. What they need, he decides, is a little competition from his angels back East. No VC is going to buy into their billion-dollar enterprise on the cheap. Ritter recalls his strategy: "I wanted to have a viable 'dumb money' foil to put up against the VC onslaught that was about to come down on us."

He flies to New York for meetings with potential angels from his investment banking days, including the chairman of Swiss Bank and the managing director of Morgan Stanley's mortgage department. The angels, it turns out, aren't exactly champing at the bit to invest in a high-risk Silicon Valley venture.



Jim Li

Oct. 30, 1995: They are interested, but the concept is hard for them to understand. They would just have to trust us if they were to invest.

Ritter returns to California confident he can raise \$3 million to \$4 million but knowing it would be "really dumb money and not good for what we have ahead of us."

BMW's in the Parking Lot

Nov. 2, 1995: They brought over five partners all the way to Alameda! I distinctly remember more than one 700-series BMW

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Diary

pulling into our parking lot and out come multiple partners in suits. This is a good sign.

Ritter feels the rush that cash-strapped entrepreneurs experience when expensive cars pull up at the front door.

Dalal and five of his nine partners are impressed by the grungy, no-frills operation. They watch a demo and quiz the founders about every aspect of InterJet and the still-nonexistent small-business Internet market.

The Mayfield men also start talking money, in vague terms. One thing's certain: They want 20 percent of the company or else "it's not worth [their] time."

Ritter never figured his gold-standard VCs would cost so much.

One week later, Ritter is even more disturbed when Dalal convenes a meeting to discuss Mayfield's demands in more detail. Pickus brokers the discussion.

Nov. 9, 1995: Josh says we're looking for a \$20 million valuation [Ritter's estimate of Whistle's market value post VC money].

Yogen says this would be a sub-\$10 million valuation. Also, he wants us to hire a new CEO within six months of the deal.... I go away contemplating a privately financed deal. Josh [stops contacting Mayfield and IVP] and we go about finding other VCs.

Ritter is insulted by the low value Dalal is placing on Whistle. But his master plan unravels even more when he gets a call from Yang at IVP. Yang proposes a valuation of roughly \$10 million, and he also wants a new CEO within six months.

Nov. 15, 1995: Geoff is proposing a two-VC deal between Mayfield and IVP. He and Yogen have talked

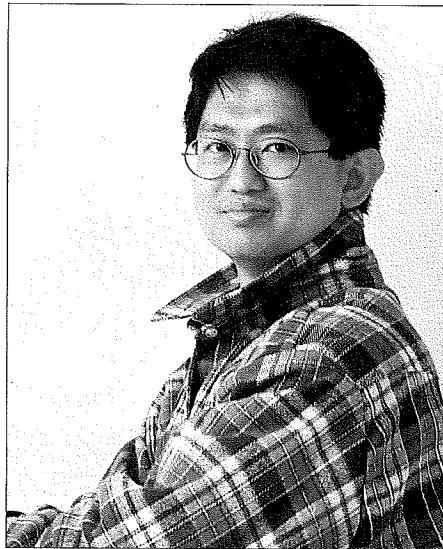
and come up with this strategy. Competition between the top tier is gone. I am faced with either going with second-tier [VCs], going [with angel financing] or working with these two top players and haggling with little ammunition.

Ritter is presented with what he considers exorbitant terms: Each VC would get about a 20 percent stake in Whistle—double the amount Ritter originally planned to give away.

The VC Cosa Nostra

Even with his sophisticated investment-banking experience, Ritter never dreamed that two competitors would join forces, but it's a typical Valley practice. Yang admits there's "definitely a Mafia" among top-tier VC firms, but he claims it's a necessary evil—the best way for VCs to spread the risk while working with partners they trust.

Although Pickus keeps telling Ritter the VC demands aren't unusual, Ritter doesn't believe him. "We weren't just technical folks off a hay truck," he recalls.



Canh Le

Nov. 17, 1995: I call Rolf Selvig at Venture One [VC industry analysts] to see how many deals get first-round valuation above \$10 million. He says almost no firms

Spring '98

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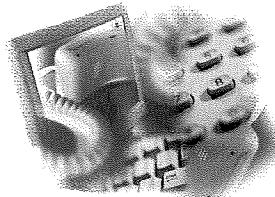
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As these underlying technologies mature, more and more businesses are taking a close look at using Internet Telephony and Net Broadcasting technologies—within their own corporate environment and outside of it to reach the world through the 'Net. Internet Telephony has moved beyond the pure hobbyist's tools of two years ago. Forecasters expect this new industry to reach a valuation of \$2.5 billion by the

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Lucent Technologies
Bell Labs Innovations



Diary

except Netscape. I'm skeptical because they work for the VCs.

Ritter, Li and Le agree to stick to their demands—giving each VC only about 10 percent of Whistle. "It's the principle of the deal. Why should we take less of a deal when they're both willing to invest in us? It means the value of the resulting deal is higher," Ritter reasons.

During the last two weeks of November, the deal reaches a stalemate. Meanwhile, plans to sell Tribe move forward. Then Ritter gets a call from Trinity, one of the second-tier VCs he'd contacted early on.

Nov. 28, 1995: Trinity is interested. ... They say they need to pair with some other firm to make this happen. Competition is further eroded. I'm starting to realize no one steps out in front in this industry.

To keep some pressure on the VCs, Ritter and Pickus set a Dec. 15th deadline for a financing package. "I knew they were squirming," Ritter says. "They had their entire partnerships interested in this deal, and they couldn't get me back to the table."

By early December, the founders have finished a more sophisticated version of InterJet. They decide to demo it for Mayfield and IVP. A week before the demo, Dalal calls Pickus with a formal offer with the first hard numbers—each VC will kick in \$2 million and each will get a 20 percent stake in the company. The founders reject it.

Dec. 7, 1995: I think it's too low, but I want these guys to be behind our deal.

The VCs are nonplussed when Ritter renews his threat to take the deal to his angels.

Dec. 14, 1995: Major demo to IVP and Mayfield ... goes well. We know we have them both in. The question is the valuation and terms.

But then Dec. 15 comes and goes.

Dec. 15, 1995: Our deadline passes without pulling the deal together. I know their partnerships want to get a handshake before the Christmas break.

During the next week, the talks take an ugly turn after Li gets a call from Dalal, who, along with Yang, is increasingly frustrated with Ritter's refusal to budge on his demands. "He asked if we were all on the same side of the table," Li recalls. "He suggested I might want to go off on my own. It struck me as an underhanded negotiating tactic."

Dalal insists he wasn't trying to drive a wedge between the founders, but just trying to clarify who really was "the driver of the company." According to Dalal, the founders couldn't agree on whether they should get equal equity stakes, so he pushed them. "I said that from our perspective, Li was the real visionary ... and should get the real founders' shares." Whatever the motive, the call confirms the trio's worst fears. Ritter writes, "We're swimming with the sharks."

Ritter gets on the phone with Dalal. "You screwed up, buddy," he yells. "This is a team, and we stick together."

Enter Pickus. For weeks, Pickus has been playing Henry Kissinger, shuttling back and forth between the increasingly agitated founders and the VCs, who were threatening to walk. "What I'm doing at this point is trying to prevent a nuclear war," says Pickus of his mediation tactics. "I've got to keep the founders from pushing so hard that there's no deal."

The Summit

Dec. 21, 1995: Mayfield's Christmas party is under way as we walk into the firm's huge conference room with Geoff and Yogen. The mood is "Let's get this done."

Actually, the founders' mood is suspicious. They're still smarting from Dalal's call. And while the deal is supposedly hung up over money, the real issue for the trio is trust and control.

Dec. 21, 1995 (cont.): The worry is the vesting of stock.

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COMPUMENTOR

Diary

Under the proposed VC terms, we'd only have 25 percent vested from the start. The rest would be vested monthly over three years. What if they fire us?

Pickus tries to head off a potentially disastrous showdown by talking some common sense to his hardheaded clients. He stresses they're never going to get a deal where they keep 80 percent of the company. "If you want to do this, then work within their confines. If not, then let's go."

But Ritter, Li and Le, who have discussed the matter endlessly, have already agreed on the answer, even if they haven't told Pickus. Only top VC connections can help them line up the management talent and industry partners they'll need to get to Pluto. In their hearts, they know they need these top-tier VCs more than vice versa.

Back inside the chilly conference room, Dalal and Yang ask, "What's the problem?" and the entrepreneurs finally put their fears on the table—they don't trust the VCs, they're afraid of being fired. The VCs respond, "If that's your concern, then let's talk about how to protect you."

Yang has just minutes left before he's got to leave for the airport. The office lights are dimming at Mayfield as they hash out new terms.

Dec. 21, 1995 (cont.): They budge. The valuation is slightly better. The VCs get 37 percent [equity stake] between them instead of 40 percent. The three of us get 37 percent in equity—they're letting us invest some of our money to raise our stake. Our [initial] vesting is 35 percent, up from 25 percent. ... We shake hands, and everyone is relieved.

Ritter walks out of the conference room satisfied. "It cost us something, but the insurance the VCs bring to our future is valuable."

Selling the InterJet

More than two years have passed since that fateful handshake, and none of the founders has been fired—yet. Whistle, now located in Foster City, Calif., has grown to 70 employees. At Dalal's suggestion, the company has redesigned InterJet, which now looks more like a toaster-size computer appliance than a Batphone. It started shipping in March of last year, with initial sales for 1997 of nearly \$10 million. The projected target by the end of 1999: \$50 million to \$100 million, say Whistle officials.

InterJet's success or failure hinges on finding a clever marketing strategy. Most small-business owners don't know InterJet exists, despite numerous industry awards. Yang admits they're struggling to develop an effective distribution channel. Initially, the Whistle team tried selling InterJet through 160 Internet service providers. Now they're working with the independent contractors hired by companies to install networking systems.

After three rounds of financing, Yang and Dalal have about \$6 million each riding on Whistle, which now is valued at \$90 million. The most recent round raised \$20 million, with the VCs helping to bring in corporate investors, including Oriental Chemical Inc. of Korea and Ricoh Company of Tokyo. It's enough money to get Whistle

Whistle Communications Corporation

Headquarters: Foster City, Calif.

Founded: 1995

Founders: Jim Li, Canh Le, Gordon Ritter

URL: www.whistle.com

Management Team:

John Hamm, President and CEO
Gordon Ritter, Founder and VP, Marketing/
Business Development

Jim Li, Founder and CTO

Doug Brent, VP, Engineering

John Butler, VP, Sales

Alex Lapidus, VP, Operations

Bob Finley, Controller

Board of Directors:

John Hamm, President and CEO
Gordon Ritter, Founder and VP, Marketing/
Business Development

Jim Li, Founder and CTO

Yogen Dalal, General Partner, Mayfield Fund
Geoff Yang, General Partner, Institutional
Venture Partners

Dave Brown, Individual Investor

Number of Employees: 70

Ownership: Private

Main Business: Whistle designs and develops the InterJet product line, which provides small offices with big-business Internet capabilities, including internal and Internet e-mail, Web access, Internet and intranet Web publishing, and firewall security.



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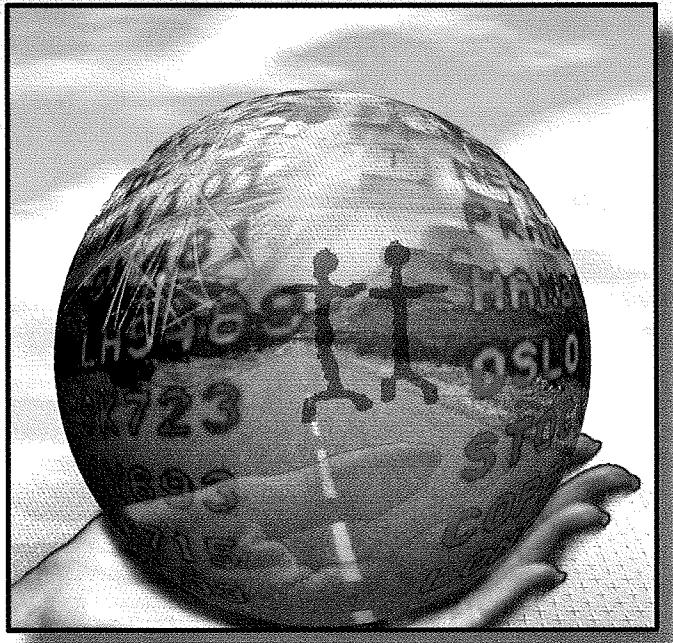
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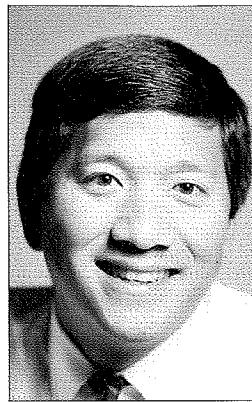
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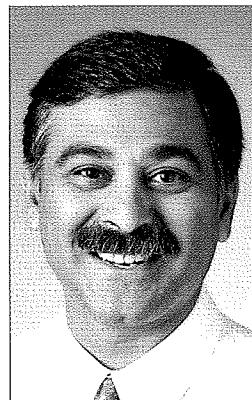
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Diary



Geoffrey Yang



Yogen K. Dalal

through the next year and a half.

The VCs have hung in there, patiently waiting for Whistle to blast off to Pluto. For them, pay dirt is seeing their investment multiply at least 10 times. On Sand Hill Road, anything less is considered sub-par. The VCs have delivered on recruiting what they call "star talent"—CEO John Hamm, former VP and general manager of Adaptec Inc., and Doug Brent, VP of engineering, who was formerly VP of product development at

Taligent Inc. "We're their eyes and ears in the Valley," says Dalal, who checks in about every two weeks.

Now more seasoned in VC ways, Ritter admits his hard stance on some demands was "unrealistic." He now realizes a fledgling company could never command a \$20 million valuation. Says a humbled Ritter, "The VCs have paid for themselves in spades."

But he knows the clock is ticking. "We have about 12 months. If we haven't cracked open the market by then, we've missed our window."

The founders enjoy swapping fantasies about what life will be like when they join the IPO Millionaires Club. Le's vision is their favorite: "One of my life goals is to ask a bank for \$1 million from the vault in \$1 bills. Then I want to dance around in it." ■

Tia O'Brien, whose writing appears in national and international publications, has covered business and politics as a television and radio reporter for 17 years.



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Photo by Neal Brown

Foreigners

Continued from page 97

is little to keep employers from bringing in what are basically exploited workers."

The abuses of the program hurt legitimate companies that can provide numerous anecdotes of the program's benefits. They also offer evidence of the hardship that resulted when they couldn't get H1-B status for employees last year. One example: Hewlett-Packard wanted to hire a woman with a doctorate degree in specialized compound materials for its optoelectronics

"IT companies don't work in the national interest, and they don't have social consciences."

—Robert Rivers

division. A Chinese citizen, she was able to start legally under her U.S. student-training visa, but because of the cap, the company couldn't get an H1-B visa for two months. This created problems for HP and left the worker without a work permit and living off her savings for two months.

The Opposition

There's obviously a huge anti-immigrant fervor in America, but the biggest stakeholders in the discussion about foreign workers have been surprisingly quiet.

Domestic Hiring Tips

Need skilled people? Engineer/activist Bob Rivers lists some ways companies could hire from the existing workforce rather than hiring foreign workers:

- ◆ Remove age prejudices to access potential employees age 40 and up.
- ◆ Hire any IT worker who can demonstrate success in programming in any language and put him or her through a short-term training program in the language of the employer's choice.
- ◆ Eliminate biases characterizing former defense workers as overpaid and underqualified.
- ◆ Give up trying to find employees who will work 80 hours a week without overtime.
- ◆ Offer term-employment contracts if concerned about the length of the current economic boom.

Engineers and software professionals are not known for political activism, and their professional organizations, such as the Institute of Electrical and Electronic Engineers (IEEE), have typically focused more on technology than on work issues.

That hasn't kept some parts of the IEEE, notably its American section and individual members, from speaking out, however. Paul Kostek, head of the IEEE-USA Career Policy Council, disputes the ITAA numbers as a starter. He says studies conducted by his organization have shown a smaller need for additional engineers and programmers. About 25,000 new electrical engineers and computer engineers graduate in the U.S. each year, and the IEEE says the annual increase in positions for IT engineers and software professionals is 90,000. But those

aren't new people, they're new positions. "Many will be filled by people who transition into new jobs," Kostek says.

He believes some of the shortages will disappear as the workforce adjusts to the economy and new technologies become more widely known. "Everyone is looking for experienced Java programmers, of

course, but there aren't any because the technology is so new." As experienced programmers know, however, it's not that difficult to learn a new language.

A Disservice to Workers

Not all critics are as polite as Kostek. Robert Rivers, who founded the IEEE-USA workforce committee in 1973 and has published the *Engineering Manpower Newsletter* for nine years, says, "IT companies don't work in the national interest, and they don't have social consciences. They're in the business to make money."

So of course companies will use the cheapest labor they can get. That's why Rivers says quotas are necessary. "In our society, the government controls the cheapest level of workers to protect others in the workforce, especially new graduates, people thinking of going into a field, workers who made an earlier commitment to a field and mature workers, who are the most vulnerable." Rivers says employers could hire from the U.S. workforce if they were willing to change their hiring practices and retrain workers (see "Domestic Hiring Tips," this page). He adds, "By opening the floodgates to immigrants, the government has done a disservice to these [U.S.] workers."

On the other hand, Mark Krikorian, executive director of the Center for Immigration Studies in Washington, D.C., and one of the best-known critics of excessive immigration, is not as concerned about the H1-B program as he is about other issues. "It's a problem, but the numbers are small compared with all the unskilled workers being admitted." He says high-tech employers are crying wolf about the quotas, however.

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Foreigners

"High-tech companies have a need for some flexibility in hiring people, but this is becoming an avenue to hire cheap workers from overseas. We already have a provision for 140,000 employment-based visas, and they aren't being used."

How important is this battle to the high-tech industry? Very, according to S.M. Mimms, Texas Instruments Inc.'s legal counsel and consultant on immigration. He says that though the number of skilled foreign temporary and permanent workers recruited every year is relatively small, they're important to the company. "When we visit graduate schools looking for experts in fields we're trying to develop, we find that they're predominately from countries other than the United States."

Texas Instruments, like Intel Corp., HP and other companies that hire such workers, can afford to hire people and have them work overseas, but that's hardly an attractive alternative for American tech companies.

What's the Solution?

Last year, U.S. Rep. Zoe Lofgren, D-Calif., proposed a short-term fix. She suggested borrowing slots from the little-used H2-B category for "temporary nonagricultural workers in short supply." Fewer than 13,000 of the 66,000 allowed annually in this category were admitted last year.

Originally, Lofgren was going to back a bill that would institute this change in immigration policy. But in December, a Lofgren spokesman said she instead has decided to work "behind the scenes" with other lawmakers and the INS to get an increase in the H1-B quota. Lofgren and tech companies face opposition from some citizens and their representatives, including U.S. Rep. Lamar Smith, R-Texas, who has been a vocal opponent of all immigration.

Longer term, everyone agrees that something must be done. Suggestions range from further restricting temporary foreign workers to expanding them, from tightening regulations to letting companies buy visas for a stiff fee such as \$10,000 that would make it less attractive to hire foreigners than to work harder to find or train Americans or permanent residents.

Sen. Abraham concluded a November hearing on the matter in Palo Alto, Calif., with the observation that expanded hearings in Washington are needed to better understand the issue and its consequences. "I think it's too early to decide what to do. We need to look at this matter strategically. ... In the absence of information, Washington tends to think high tech is like traditional industries that would take a long time and huge investment to move overseas. I don't think [the government] appreciates how quickly technology companies can react."

He expects the issue to be hot, however: "I assume there will be strong opposition to any move to increase immigration quotas." The message is clear. This election year isn't the best one for high-tech companies to look for relief. There's a good chance they may not be able to hire foreign temporary workers for at least part of this year—and it's not clear they'll be able to do much about it. ■

Paul Franson writes primarily about the high-tech and wine industries from his home in Napa Valley, Calif.

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Jungle

Continued from page 110

a Web-wide search engine with automatic categorization. Traffic on the service (www.nsearch.com) is growing at 20 percent per week, with 80,000 to 90,000 searches per day as of late December 1997. "We are a search engine, but we have this unique classification scheme we apply to results, and we offer access to premium material," says marketing manager Leslie Ray. "A lot of high-quality information from the publishing world on services such as [Reed Elsevier Inc.'s] Lexis-Nexis or [Dialog Corp.'s] Dialog has been inaccessible to the general public."

Excite is doing something similar, indexing 300 to 400 content sites three to four times a day. Bell says it means "80 percent of the value you get from Lexis-Nexis you get from us for free."

While limiting the collection of indexed documents may provide an interim solution, others are pursuing fundamentally new technologies.

Visualizing New Categories

Three classic science fiction stories about the Net—*True Names and Other Dangers* (1981) by Vernor Vinge, *Neuromancer* (1984) by William Gibson (which coined the word "cyberspace") and *Snow Crash* by Neal Stephenson (1993)—all describe user interfaces based on 3D representations of large data networks.

No one has yet built anything that matches the richness of the environments described in those literary works, but companies such as Lucent Technologies Inc.'s Visual Insights, ThemeMedia Inc. of Redmond, Wash., Perspecta Inc. of San Francisco, Semio Corp. of San Mateo, Calif., and Xerox Corp.'s Inxight are trying to tap into native human capacities to deal with 3D space. Instead of answering queries with lists of documents, these companies are building multidimensional, immersive environments that provide a more intuitive view of large collections of data grouped or clustered by meaning.

What's immediately striking about these offerings is their visual presentation. A 3D data representation can look like anything from a topographic map to a bike wheel with 100 spokes. But behind the pretty pictures,

they all rely on proprietary methods of categorizing documents and search results. Just as categorization makes the difference between a well-ordered library and a random heap of books, the value of the pictures these companies provide depends on their ability to group search results into meaningful categories.

A newcomer in this area is Visual Insights, an independent unit of Lucent, which unveiled a new set of products in December for visualizing semistructured data as well as information generated by automated systems. "There has been an explosion in the ability to collect data, but not to analyze it or take action," says James Weichel, president of the company. "A more challenging problem is visualizing data without a physical or geographic metaphor."

Weichel offers a striking example. Imagine trying to numerically describe a children's game in which players alternately choose numbers from one to nine in an attempt to get three of them that add up to 15. Each number may only be chosen once during the game, so player A might start by choosing seven and player B by choosing eight; player A then chooses six, and then player B would have to choose two; player A would respond with 5 to prevent B from winning.

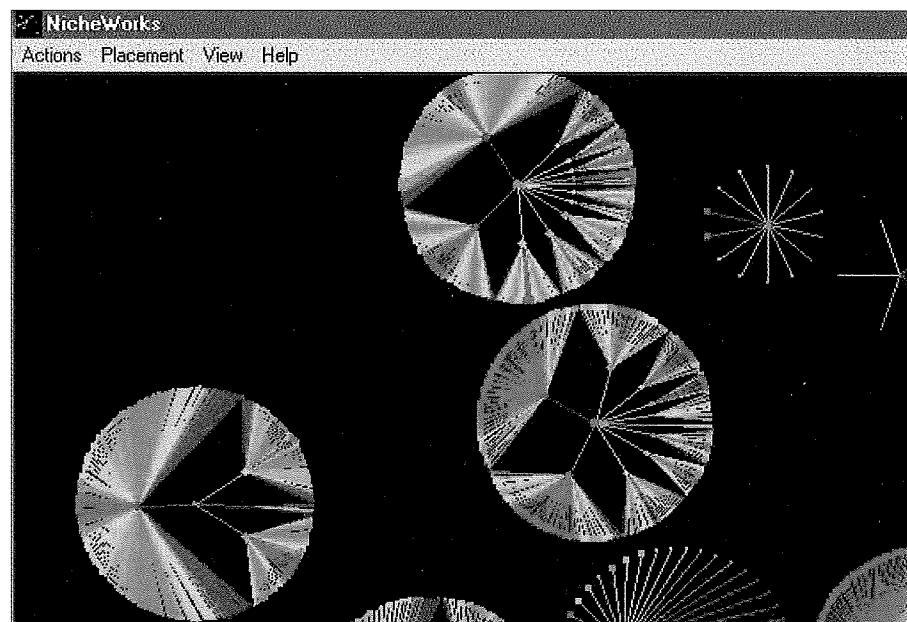
The variations are numerous and hard to solve—until you realize this scenario corresponds exactly to tic-tac-toe.

Weichel says similar leaps from data to

A 3D data representation can look like anything from a topographic map to a bike wheel with 100 spokes.

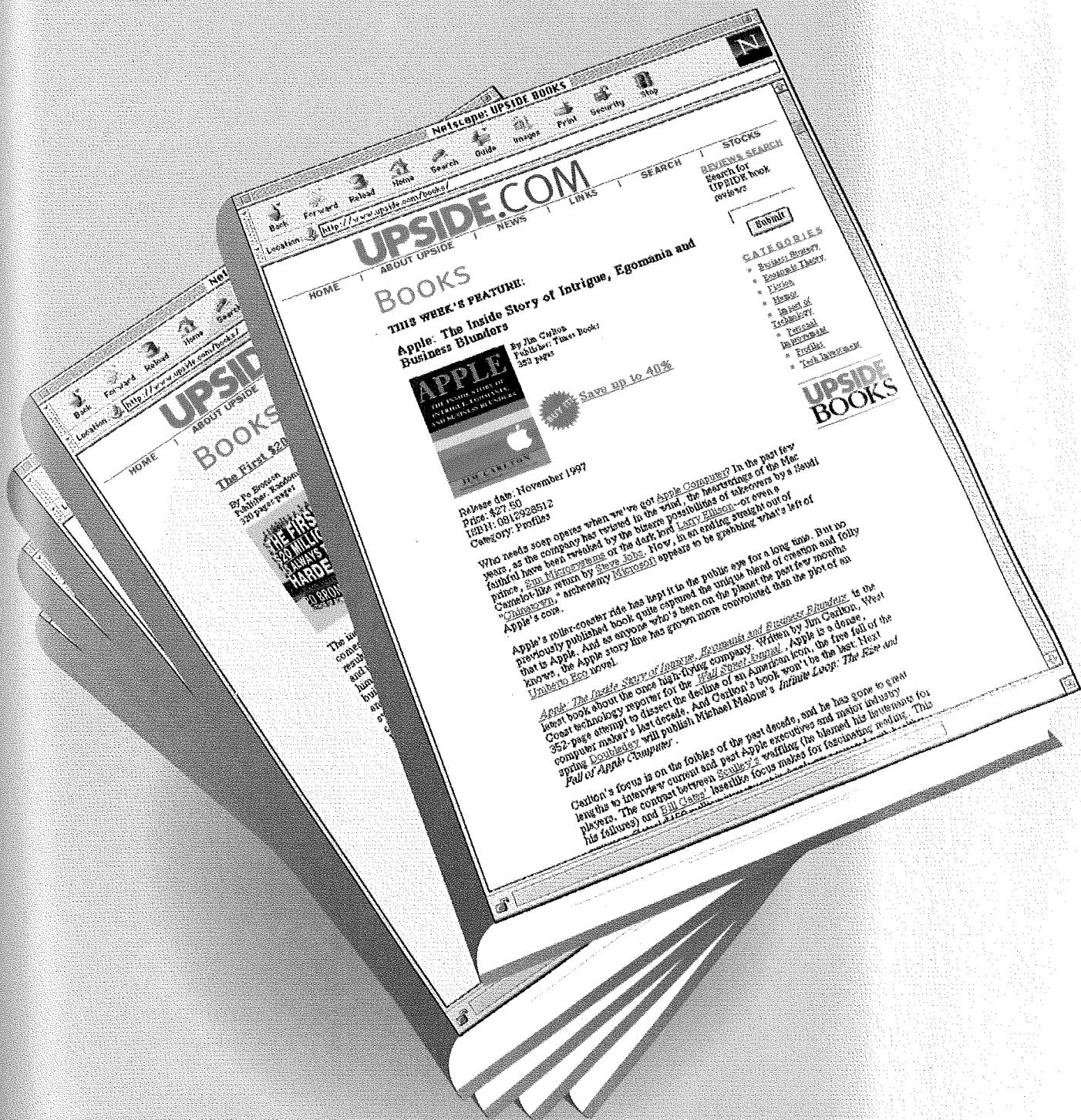
pictures are equally useful in areas such as network management, Year 2000 problem analysis, data mining, call-center operation and fraud detection. Much of the software and intellectual property now owned by Visual Insights (the company has nine patents) has been under development for several years, and the company, which employs about 40 people (more than any of the other visualization companies), is likely to eventually leave the shelter of Lucent through an IPO.

Like others in the search industry (such as Verity Inc. of Sunnyvale, Calif., and Aptex Software Inc. of San Diego), ThemeMedia has its roots in the U.S. intelligence community. Founded by researchers from the Pacific Northwest National Laboratory, ThemeMedia is led by supercomputer guru



How big is your company's year 2000 problem? In the Visual Insights screen grab above, each wheel represents a software system, such as payroll. Spokes represent individual programs—red spokes indicate programs with Year 2000 bugs. By clicking on the end of a spoke, a programmer can view and repair the actual code.

We're Really Stacked.



www.upside.com/books

Jungle

Gary Smaby, who serves as CEO, and former Cray Research CEO John Rollwagen, who is chairman of the board.

"The best cognitive processor is between your ears, and a visual metaphor means that trends are patterns that can be seen," says Steve Ardire, ThemeMedia's senior director for business development. Though it isn't shipping any products yet, ThemeMedia plans to make money selling server software and providing free client software for viewing. "We have a core offering that could be a front end for an Infoseek or a collaborative filtering company such as Net Perceptions or Autonomy," Ardire says.

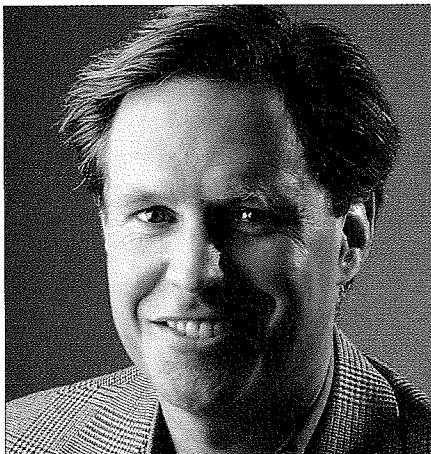
The hope is to go beyond the limits of Boolean searching, which is based on particular terms and logical operators such as AND, OR and NOT. "The problem with Boolean is that users have to know specific facts about documents before they conduct a search," Ardire says. "[Our technology] lets you drill down deeper to reveal new data, and none of the Boolean offerings allow you to do that."

Another company using visualization is Perspecta. "If you know exactly how to define a query, a search engine is useful," says President and CEO Steve Holtzman. "We

are aiming at the other 90 percent who can't define exactly what they want, and we allow them to dynamically reorganize the data depending on how they want to see it" (for example, reordering a news database according to date, topic or source).

Founded in January 1996 by MIT Media Lab alumni, Perspecta has received funding from Encyclopaedia Britannica and Informix Corp. and counts these companies, as well as The Sabre Group, as customers.

Visualization-software companies share the ability to present an immediate and intuitive connection between different clusters of data and to relate those to a user's position in a 3D environment. But it's not the only new approach.



George Bell, president and CEO of Excite Inc., Redwood City, Calif.

Collaborative Filters

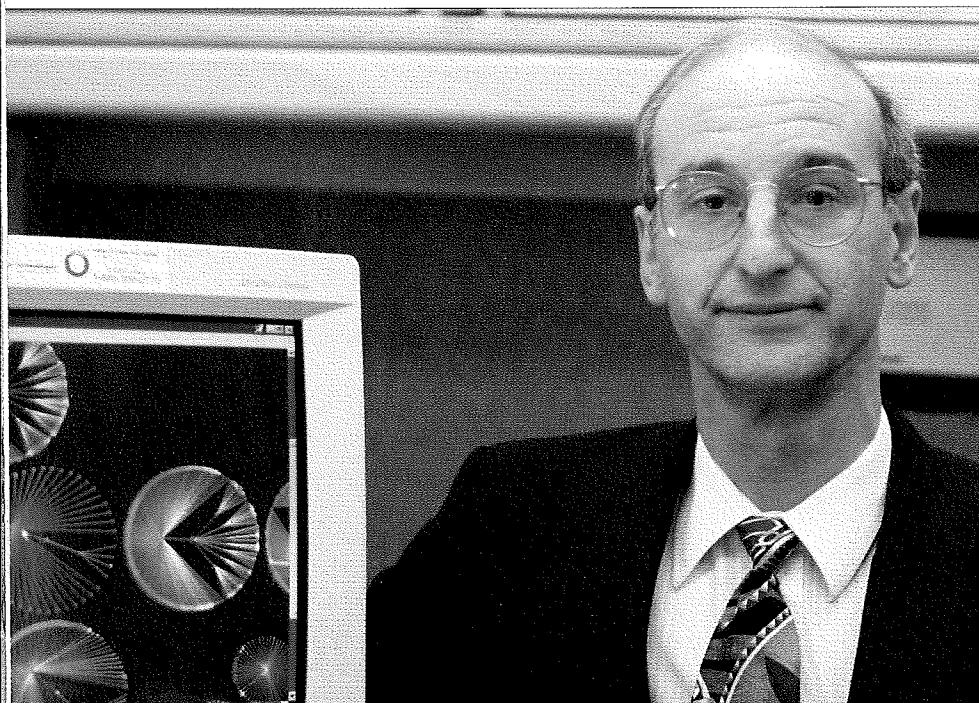
How do you know what movie to see, what restaurant to eat at, or what book to read? If you're like most people, you rely on the recommendations of peers. The Net offers a unique way for individuals to pool their collective wisdom through collaborative filters, or recommendation systems. A collaborative filter can allow a Web site to offer restaurant ratings, for example. When people visit the site, they are asked to rate a few restaurants, and the system then finds others with similar preferences and makes suggestions about places to eat.

Collaborative filters vary by the type of subject matter they deal with, whether they match people to people or people to things, and whether they collect data actively and explicitly, passively and implicitly, or in combination. But they all provide answers to questions and predict what a given person will like by condensing opinions from thousands of users. Unlike search engines, collaborative filters learn about the preferences of individual users, and they can offer recommendations about things that can't be indexed, such as video, for example.

There are several companies and products in this space, including Net Perceptions Inc.'s GroupLens Recommendation Engine, which helps companies match individual customers' tastes and is backed by The Paul Allen Group and Hummer Winblad Venture Partners; Autonomy Inc.'s Agentware i3, which helps Web publishers deliver targeted content; LikeMinds Inc. of San Francisco, which focuses on one-to-one marketing and has a movie recommendation demo; Gustos Software LLC of Laguna Hills, Calif., which lets users rate Web sites; and Pittsburgh-based WiseWire Corp.'s WiseWire information service.

But the most prominent is Firefly Network Inc., a Cambridge, Mass.-based company founded in 1995 by another group of MIT Media Lab researchers. It was first out of the gate with a music recommendation system (later sold to a startup called Launch). "We are moving toward a model of computing and information retrieval that is based around the user instead of an operating system or datacentric model," says Saul Klein, Firefly's senior VP of corporate brand and strategy.

Firefly has fallen short of some of its early, perhaps overinflated, hopes—the company was supposed to be public by now but isn't.



James Weichel, president of Visual Insights, a unit of Lucent Technologies.

the net prophets

“Never underestimate
the Internet.
Manipulate it.
Respect it.
But don't try
to dominate it.”

Jerry Yang
Chief Yahoo
Yahoo!
Internet World Speaker

Internet World Canada '98
February 3-6, 1998
Toronto, Ontario

Spring Internet World '98
March 9-13, 1998
Los Angeles, California

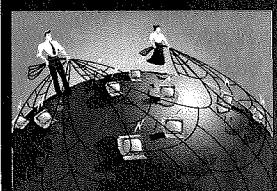
Summer Internet World '98
July 13-17, 1998
Chicago, Illinois

Fall Internet World '98
October 5-9, 1998
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In addition, the math behind collaborative filtering is easy to duplicate, which has split the market among many vendors, and the killer app (or the killer data set) for collaborative filtering has been elusive.

"I don't want to knock collaborative filtering—we use it," says Yang of Yahoo, which is using Firefly in its My Yahoo service. "Firefly has done a good job with movies and music, but our focus now is to look at such technology to improve our content targeting and advertising targeting." Striking a balance between active/explicit and passive/implicit search and navigation hasn't been done. It's an area ripe for new solutions, and one of the more intriguing is Alexa Internet.

The Alexa service is delivered via a client that looks like an additional toolbar for the Netscape or Internet Explorer browsers. Alexa displays information about whatever site a user is accessing, lets users vote on site quality and offers suggestions about where to go next.

Alexa's information is generated by end users, from third-party information providers (including Encyclopaedia Britannica) and from an analysis of the company's copy of the entire Web. By gathering copies of all publicly accessible sites (a collection that is now 8 terabytes and growing), Alexa can analyze the link structure of the Web to determine which pages are relevant to each other, and allow users to request archived Web pages when a "404—File Not Found" error occurs. Data gathered by Alexa is donated to the nonprofit Internet Archive (www.archive.org) for long-term safekeeping.

"If you take a path through the woods, you benefit from the exploration people have done before you in finding the best way up the mountain or down to the lake," says Alexa's Kahle. "We do the same thing for the Web. When your browser hits a URL, the toolbar requests information about it

from Alexa's servers, and we record that an Alexa user has spent time at that site as a kind of vote."

What Alexa has in common with the collaborative filtering and recommendation systems is an approach based on metadata, a loosely defined term that is rapidly becoming a buzzword used to describe any data about other data. A call number in a library, a keyword describing an article

and author tags in HTML are all examples of metadata.

Metadata is becoming increasingly important because it enables searches through content that can't be indexed easily, as well as through enormous collections of data. Metadata has become a major focus for the World Wide Web Consortium, which is developing a new standard called XML. This is a specification for defining new markup languages to meet the future needs of Web documents and Web searching.

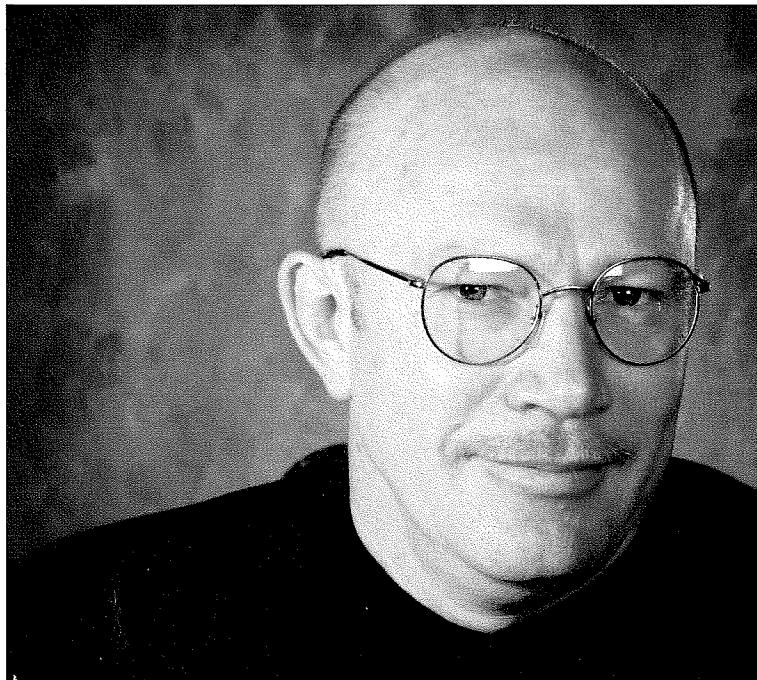
Enterprise Software

Companies such as Verity, Fulcrum Technologies Inc. of Ottawa, Ontario; Compass-Ware Development Inc. of New York; Quadralay Corp. of Austin, Texas; Personal Library Software (PLS) Inc. of Rockville, Md.; Open Text Corp. of Waterloo, Ontario; Open Market Inc.'s Folio unit; and Excalibur Technologies Corp. of Vienna, Va., are pursuing opportunities created by corporate intranets. They're competing with offerings from the public search engine companies, including AltaVista, Infoseek, Lycos and Excite, all of which

are licensing the software they use to support their public sites.

Like the "elite content" companies, these firms know that the value of the data being searched determines the value of search applications. And because data inside companies is extremely valuable, the tools that access this data are valuable, too.

One of the most established companies in this space is Verity, which emphasizes the work it has done to build interfaces to other vendors' database products and is hoping to distance itself from low-end search products. With dozens of free or low-cost search tools available, Verity wants to stand out from the crowd by building connections into Lotus Notes and other large databases, not by adding a more sophisticated user interface. "Search and retrieval is fragmenting into two or more primary camps: commodity personal search and tools for corporate use," says Ronald Weissman, Verity's VP of marketing.



Brett Newbold, president, Open Text Corp., Waterloo, Ontario.

"If you take a path through the woods, you benefit from the exploration people have done before you. ... We do the same thing for the Web," says Alexa's Brewster Kahle.

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Ampersand

Symantec
has acquired
DMA

Borland
International
has acquired
Prisma Software

Reuters America
has acquired
EQUIS
International

GTIS
has acquired
FormGen

Adaptec
has acquired
Incat Systems

Quarterdeck
has acquired
Landmark Research
International

Attachmate
has acquired
KEA Systems

Intel Corp.
has acquired
Syncro
Development
Corp.

Mathsoft
has acquired
StatSci

Kewill Systems Inc.
has acquired
Exeter
Software Ltd.

ProxyMed
has acquired
Clinical
MicroSystems, Inc.

Microsoft
has acquired the
assets of
Sabaki Corp.

Compuware
has acquired the
assets of
MicroQuill

IDEIX
Laboratories, Inc.
has acquired
Advanced Veterinary
Systems

SHL Systemhouse
has acquired
SECA

Fujitsu-ICL
has acquired
The Specialty Retail
Line Applications
Division of DataServe

JetForm
has acquired
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has acquired
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SunGard Data
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Commoditization is an issue, but the most serious threat to the small and mid-size search companies is competition from IBM Corp., Oracle Corp. and Microsoft, all of which are adding functions to existing products and developing new ones.

The stock prices tell the story. By the end of 1997, Fulcrum had dropped from a 1996 high of \$20.50 to less than \$2; Verity had plunged from more than \$50 in spring 1996 to about \$5; and Excalibur had recovered to about half the value it had in early 1997.

"Verity, PLS, Fulcrum and similar companies are having a hard time because search by itself doesn't solve anyone's real problem. There is much more to do," says Open Text president Brett Newbold. "How do you compete with Oracle when Oracle says it is free, or Microsoft makes it a free part of Exchange?" Smaller companies are running for cover by creating focused applications. "Every [company that] was anywhere near this space is now calling itself a 'knowledge management' company," Newbold says. Knowledge management is evidently on its way to becoming the total quality management or re-engineering of the late 1990s—even Open Text is describing itself as a "collaborative knowledge management company."

Customer service is another good candidate application in this area. Paul McGraw, executive VP and co-owner of APS Technologies, a Kansas City, Mo., supplier of SCSI and other peripheral products, says his company would like to find a way to categorize and access the knowledge contained in the problem-resolution notes taken by technical support representatives. APS has used an extensive coding scheme to key into typical problems, but tapping the megabytes of text notes is a daunting task.

"A simple search may not find parallel port cables with SCSI, or a machine that freezes may not be diagnosed correctly as having a SCSI problem," McGraw says. APS has worked with software from Folio to provide some context-sensitive help, but its greatest successes in diagnosing problems have come from manually analyzing the data, or from running SQL queries against an AS/400 database.

Clearly, there is room for improvement

and a market for enterprise tools. But advances in this area will depend on the evolution of new search technology.

Future Search

Yahoo has shown that ads can support navigation services and that branding can be as important as technology. If there are no great leaps forward in search technology, refining the art of human assistance will be the next-best thing, and the art of building search services will depend on knowing where to add human help, as Yahoo has done.

"We don't believe there is this magic technology to make things much better or worse," Yang says. "Anything we adopt has to address 80 percent of the users. If it's useful for only a few, it's not our business and we can't support it."

For any technology player that hopes to win, Yang adds, an offering "not only has to scale, but also must be compelling enough that lots of people want to use it, and most have failed at either or both." Still, Digital proved the importance of technical brute

Commoditization is an issue, but the most serious threat to the small and midsize search companies is competition from IBM Corp., Oracle Corp. and Microsoft.

force when its AltaVista service increased the value of the Web by an order of magnitude overnight. New ways to cluster and view search results and to iterate searches could do the same. Standards to allow

continued on page 155

Digging for Data: Where and How to Look

Some of the frustration with search engines can be traced to the fact that most users don't have a clue how to use the technology effectively. For starters, entering just one word into a search engine is like using a backhoe to pick out a splinter. Search engine operators say that among those rare users who enter more than a single term, few think carefully about synonyms or are adept at making queries using Boolean logic—for example, "A AND (B OR C)." Among those who do understand Boolean logic, many don't take the time to read the directions for each search engine's command syntax.

But because search technologies are still stupid, users have to be smarter about making them work and about zeroing in on the good stuff by using several engines. One option is to use metasearch services—such as www.mamma.com, www.metasearch.com and www.search.com—which combine results from more than one database. Search experts also suggest that those digging for data focus their search re-

quests, find unique identifiers associated with the topic (proper names, geography, dates and jargon), play with synonyms and keep trying.

The best searches work by iteration, and sometimes by coming at the question from a different angle or by using a different set of data (Usenet archives rather than the Web, for example). Maybe the right answer isn't indexed on the Web but can be found within a vendor's Web site. The trick is to know how and when to broaden a search and when to narrow it.

You may also want to consider using a fee-based service. Offerings include Northern Light Technology's service (www.nlsearch.com) and Infonautics' Electric Library (www.elibrary.com). Or if you want to pay through the nose, try Dialog Corp.'s Dialog service (www.dialog.com) or Reed Elsevier Inc.'s Lexis-Nexis (www.lexis-nexis.com). These last two services charge for searches based on the libraries accessed, the connect time required and the number of documents printed. —J.U.

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Search Sectors

Notable players in four categories of software

The only way to categorize the companies developing search technology is to be arbitrary about it. The boundaries between different segments are blurry (Excite, Infoseek and other Web indices sell their software for use on intranets), and every successful new company will end up competing against—or possibly being acquired by—the likes of Microsoft, IBM, Oracle and Netscape.

—Michael Mattis and Jeff Ubois

Traditional, Ad-supported Search Engines and Directories

"In terms of aggregate traffic, ad revenue and brand recognition, Yahoo is clearly the leader in the search and directory space. For a long time it has been a two-horse race with Yahoo still well ahead of Excite. This space is no longer about search, as the technology of search has essentially become a commodity (witness the fact that Yahoo even licenses search technology from AltaVista). Instead of trying to implicitly compete with one another, search and directory companies are starting to aggressively pursue the same audience as AOL—they are competing with online services (as news and general information sites). AOL has even sold its equity stake in Excite, as they now see the company as a competitor."

—Patrick Keane, Jupiter Communications LLP

Yahoo Inc.

Location: Santa Clara, Calif.
URL: www.yahoo.com
Ownership: Public (Nasdaq:YHOO)
Main Product: Yahoo (Yet Another Hierarchical Officious Oracle) software locates, identifies and sorts material stored on the Internet.

Excite Inc.

Location: Redwood City, Calif.
URL: www.excite.com
Ownership: Public (Nasdaq: XCHT) (Intuit Inc. recently invested \$40 million in Excite.)
Main Product: Excite ICE (Intelligent Concept Extraction) searches the Web and Usenet for documents containing keywords and related concepts.

Infoseek Corp.

Location: Sunnyvale, Calif.
URL: www.infoseek.com
Ownership: Public (Nasdaq: SEEK)
Main Product: Infoseek Search searches the Web, specific sites, URLs, titles or links without Boolean operators.

Lycos Inc.

Location: Framingham, Mass.
URL: www.lycos.com
Ownership: Public (Nasdaq:LCOS)
Main Product: Lycos Search locates, retrieves and manages information stored on the Net.

Inktomi Corp.

Location: San Mateo, Calif.
URL: www.inktomi.com
Ownership: Private
Main Product: Inktomi Search Technology is a scalable engine for searching and retrieving information stored on the Internet. It powers such services as *Wired's* HotBot.

AltaVista Search Network Inc.

Location: Palo Alto, Calif.
URL: <http://altavista.digital.com>
Ownership: Digital Equipment Corp. (NYSE: DEC)
Main Product: AltaVista Public Search aggregates and retrieves data from the Internet. AltaVista licensing includes deals with TPI (Telefonica Publicidad e Informacion, Spain) and Yahoo Inc.

Recommendation Systems/Collaborative Filtering

"The players in this emerging market consist of technology enablers, which are attempting to create one-to-one marketing solutions, and full-service solutions providers, which are not only creating tools, but also are creating the platforms to allow content and commerce companies to take personalization and its opportunities to the next level."

"In this pack, Firefly has the best vision of an end-to-end solution. Since its inception, the company has shown how its product can make communities come alive in a number of settings. In particular, Firefly has shone in a number of music and media-rich applications. [Among] others that have the guile and experience to stand out [is] Alexa, the brainchild of the folks behind WAIS and NetPerceptions."

—Allen Weiner, Dataquest Inc.

Firefly Network Inc.

Location: Cambridge, Mass.
URL: www.firefly.net
Ownership: Private
Main Product: Firefly Catalog Navigator personalization software captures and adds preference and general interest-level information about client businesses and their products according to customers' personal profiles.

Net Perceptions Inc.

Location: Minneapolis
URL: www.netperceptions.com
Ownership: Private
Main Product: GroupLens Recommendation Engine tailors a client Web site's content to each of the site's customers.

LikeMinds Inc.

Location: San Francisco
URL: www.likeminds.com
Ownership: Private
Main Product: WebSell is a collaborative filtering and predictive modeling technology that taps customer's behavior data based on their online interactions. It then identifies product selections that have the "best chance" of being purchased by targeted customers.

Alexa Internet

Location: San Francisco
URL: www.alexa.com
Ownership: Private
Main Product: Alexa Internet is delivered via a client that looks like an additional toolbar for the Netscape or Internet Explorer browsers. Alexa displays information about the site a user is accessing, lets users vote on site quality and offers suggestions about where to go next based on the sites this user, or others like him or her, have visited. Alexa's information is generated by end users, from third-party information providers, including the Encyclopaedia Britannica, and from an analysis of the company's copy of the entire Web.

Imana Inc.

Location: San Francisco
URL: www.imana.com
Ownership: Private
Main Product: Using agent technology, Imana's Talisman software enables product and service companies to offer personalized information delivery, targeted advertising and self-forming online communities.

WiseWire Corp.

Location: Pittsburgh, Pa.
URL: www.wisewire.com
Ownership: Private
Main Product: Using what the company calls smart filtering, WiseWire for Web Sites integrates into a business's Web site, linking it to updated, real-time information specific to a business's objectives in order to build community around shared interests.

Gustos Software LLC

Location: Laguna Hills, Calif.
URL: www.gustos.com
Ownership: Private
Main Product: Gustos Guide is a recommendation engine for commerce and ad servers. Using collaborative filtering, it lets users rate Web sites.

Jungle

Enterprise/Intranet Software

"While Verity raced to an early lead as the premier search engine for enterprise Web sites, it is now facing stiff competition from multiple sources. Moreover, with the advent of Microsoft's Index Server as a core component of a free NT Web server, basic full-text retrieval is rapidly becoming a commodity service in cyberspace. Needed are network-centric solutions that offer superior precision and recall, with a minimum of administrative overhead."

—Geoffrey Bock,
Patricia Seybold Group

Verity Inc.

Location: Sunnyvale, Calif.
URL: www.verity.com
Ownership: Public
(Nasdaq: VRTY)
Main Product: Search'97 is a scalable, customizable knowledge retrieval solution for organizing and navigating enterprise information resources.

Microsoft Corp.

Location: Redmond, Wash.
URL: www.microsoft.com
Ownership: Public
(Nasdaq: MSFT)
Main Product: Microsoft Index Server is a full-text retrieval engine that comes included with Microsoft's NT Web server software.

Excalibur

Technologies Corp.
Location: Vienna, Va.
URL: www.excalib.com
Ownership: Public
(Nasdaq: EXCA)
Main Product: Excalibur RetrievalWare is a set of tools for building text-based knowledge retrieval solutions that can search through information located on corporate networks, including intranets, the Web and other knowledge repositories.

Fulcrum

Technologies Inc.

Location: Ottawa, Ontario, Canada

URL: www.fulcrum.com

Ownership: Public

(Nasdaq: FULCF)

Main Product: Fulcrum Knowledge Network is an information retrieval solution for business. It provides agents, document summarization and intuitive searches of the Web, file servers, intranets and databases.

Open Text Corp.

Location: Waterloo, Ontario
URL: www.opentext.com
Ownership: Public
(Nasdaq: OTEXF)

Main Product: LiveLink Intranet is a Web-based, scalable, collaborative knowledge management application for intranets. A component of the technology, LiveLink Spider, crawls designated intranet and Internet Web sites, retrieving data that is then indexed and catalogued.

Personal Library Software (PLS) Inc.

Location: Rockville, Md.

URL: www.pls.com

Ownership: Joint venture

Netscape and GE Information Services

Main Product: The PLS family combines enterprise administration with full-text information retrieval on corporate intranets and the Web.

Sovereign Hill Software Inc.

Location: Hadley, Mass.

URL: www.sovereign-hill.com

Ownership: Private

Main Product: Sovereign Hill's InQuery distributed intelligent search accepts queries in plain English and then finds, retrieves and sorts data from appropriate databases.

Continued from page 152

searching through multiple databases will also be important. A truly robust software standard for database access could shift the battleground from the Web back to the desktop-software market.

At the same time, search is becoming a commodity; its future value depends increasingly on the associated data and applications. Poor search technology married to excellent content or applications beats great search technology applied to trivia.

For investors, that means search companies without solid applications are, or should be, passé. The likely winners will be the big companies that traditionally take over commodity businesses and small companies that marry search to more focused applications.

Many search tools could follow the path of desktop publishing to become a feature in every application rather than something that stands alone. "We are going to see search functionality built into many applications," predicts Microsoft's Dumais.

Though the early winners will be those that make the fewest demands on end users, search is important enough that users will change their behavior to get better results. And as Vannevar Bush indicated, it will change how people think, offering the freedom to forget, to remember and to know at will.

"[Man's] excursion may be more enjoyable if he can reacquire the privilege of forgetting the manifold things he does not need to have immediately at hand," Bush wrote, "with some assurance he can find them again if they prove important." ■

3D Visualization

"Data visualization is the latest emerging trend for analysis of large volumes of detailed data. Current grid and chart presentation methods are too limited for viewing complex result sets with many different variables. As an adjunct for reporting and data mining, visualization tools give the end user the ability to comprehend tens of thousands of items in a single view. We see visualization tools and components as a growing market over the next two years. [However,] it is too early to see a clear front-runner in this emerging sector."

—Don MacTavish, Meta Group Inc.

Visual Insights

Location: Naperville, Ill.
URL: www.lucent.com/
Ownership: A unit of Lucent Technologies Inc., (NYSE: LU)
Main Product: Visual Insights is interactive data visualization software developed at Bell Labs. It displays 3D macroscopic views of data that can be manipulated by users.

ThemeMedia Inc.

Location: Redmond, Wash.
URL: www.thememedia.com
Ownership: Private
Main Product: SPIRIX is a prototype intended to replace text-based retrieval and analysis with an interactive, 3D visualization-based system that uses landscape-like interfaces to categorize data.

Perspecta Inc.

Location: San Francisco
URL: www.perspecta.com
Ownership: Private
Main Product: The SmartContent System is a scalable development platform for navigation, online analysis and profiling for applications using 3D visual interfaces. It facilitates interaction between a company and its customers, distributors, suppliers and partners.

Inxight

Software Inc.
Location: Palo Alto, Calif.
URL: www.inxight.com
Ownership: A Xerox Corp. enterprise company (NYSE: XRX)
Main Product: VizControls displays large quantities of information as graphic or visual representations. Users view thousands of data points, documents or information objects at once in various graphical ways.

Semio Corp.

Location: San Mateo, Calif.
URL: www.semio.com
Ownership: Private
Main Product: SemioMap displays relationships between categories of information in order to focus a search on relevant information and sift out the irrelevant. It can answer open-ended queries, such as "Why has our company lost market share to the competition?"

Jeff Ubois (jubois@netcom.com) is an independent consultant who has been digging through large databases and writing about the Internet for more than a decade.

Cyberwars Redux

By Jonathan Littman

We envy the French their great cooking, sense of style and, of course, their tradition of romance. But the French have also distinguished themselves in the critical field of economic espionage.

In the 1970s, the French government, fearful of being left behind in the technological developments of the era, began targeting major American corporations such as IBM, Texas Instruments and Boeing, to name a few. France's espionage agency, the DGSE, planted engineers within these companies, and a generation of American innovation was secretly passed on to competing French companies.

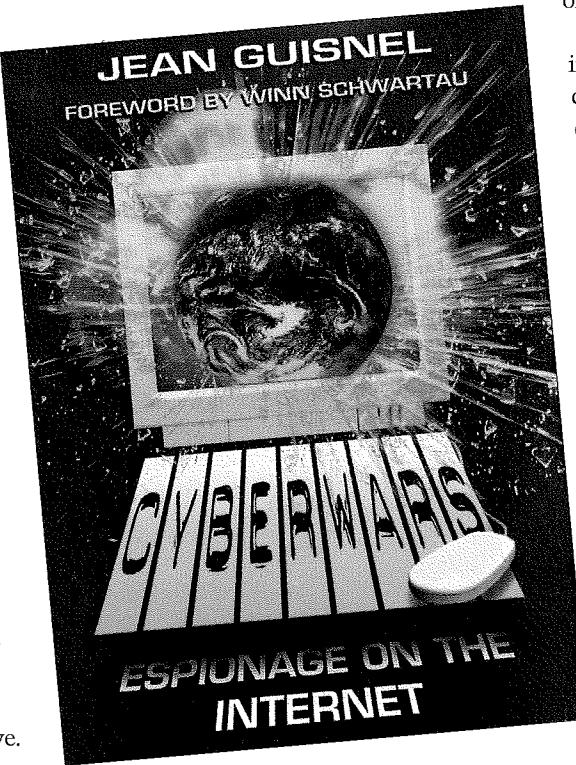
It was with this history of French espionage in mind that I began reading *Cyberwars: Espionage on the Internet*. But instead of gaining detailed insight into French spying, I was surprised to find the French violations of the 1970s and 1980s dismissed in two pages. If this book is at all representative, it seems the French envy us, at least for our expertise in economic espionage and all things technological. Much of the book is devoted to the author's rantings about American cyberespionage and an overview of high technology from a European perspective.

Jean Guisnel, who works for the prestigious French newsweekly *Le Point*, has penned several books in French about the intelligence community and appears to know a thing or two about electronic skullduggery. He describes the latest methods of spymasters, such as the troubling fact that although encryption may protect your files in transit, your keystrokes and monitor can give off electromagnetic radiation that may be picked up by radio receivers several hundred feet away.

But with a few exceptions, the first half of *Cyberwars* is mostly a rehash of hacker and cypherpunk lore, issues of computer crime, privacy and cryptography that are better covered elsewhere. This may be breaking news for French readers, but it's

ancient history for most Americans familiar with high tech.

In the second half of *Cyberwars*, however, Guisnel displays his national colors, documenting America's alleged economic violations. And if Guisnel is correct, we've not only learned from the French but have added our own twists.



Cyberwars: Espionage on the Internet by Jean Guisnel, 250 pages. Plenum Press, New York, 1997; \$26.95.

The author recounts, for example, that after the June 25, 1988, crash of an Airbus jet, an excerpt from the accident report promptly appeared on the Internet. What was unusual was that the report hadn't yet been made public, and the sections that defended the French airplane maker had been deleted. "Then," writes the author, "hostile messages against Airbus and its French partner, Aerospatiale, began mysteriously appearing in newsgroups."

Guisnel reports that Aerospatiale officials tracked the messages to the United

States through anonymous servers, and broadly concludes, "Based on analysis of the [address] wrappers, Aerospatiale strongly suspected Boeing had just launched one of the first big campaigns of misinformation on the Internet." It's an intriguing tale, but like much of *Cyberwars*, the author fails to balance it with an opposing version of events (what did Boeing say?).

French jealousy aside, it's clear that information is now a major force in the contracting and research efforts of major corporations and nations. But it doesn't necessarily involve political might or misinformation. Guisnel surveys the latest in network research analysis software, a program called Taiga developed for France's intelligence agency, that searches text in any language.

More novel is his pinpointing high-end international economic intelligence companies, such as the U.S. company Kroll Associates, as a booming growth market. Once again, the French seem to envy us. Soon, Guisnel predicts, the Big Four U.S. accounting firms will get in on the act. Since these firms are already dominant in Europe, Guisnel quotes experts who worry about the American accounting giants "gaining an ever-tight grip on worldwide business intelligence and penetrating local markets."

The author is at his most interesting when he's bashing U.S. efforts and charting these broad economic information trends. He also does a good job portraying the thinly veiled anarchist underpinnings of many U.S. cypherpunks who appear to believe technology is more important than government.

You may not agree with Guisnel's conclusion, but I found his views a nice respite from the lockstep libertarian mindset of too many U.S. testosterone-charged techie publications. ■

Jonathan Littman (jlittman@well.com) is the author of *The Fugitive Game* and *The Watchman* (both published by Little, Brown & Co.).

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The Best Mousetrap

By Ron Hogan

What separates successful new technologies from duds? Why has the compact disc player become almost ubiquitous, while a true video phone (as opposed to CU-SeeMe and other online telephony) is still years away from commercial viability?

The key to understanding the commercialization process, says Vijay Jolly, a professor of strategy and technology management at Lausanne's International Institute for Management Development, lies in the dual recognition that a technology is not a product but a capability embodied within a specific set of products, and that there's a difference between innovation and value realization. The best mousetrap in the world won't help you if the market isn't interested in catching mice.

In dense, example-laden prose, Jolly thoroughly dissects the commercialization process, breaking it into five subprocesses:



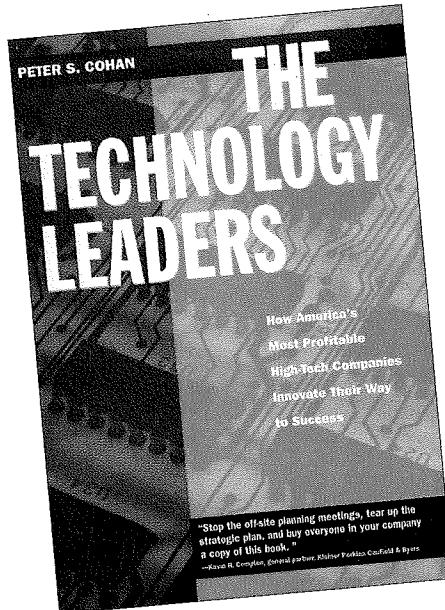
Commercializing New Technologies: Getting from Mind to Market by Vijay K. Jolly, 456 pages. Harvard Business School Press, Cambridge, Mass.; 1997; \$35.

Stating the Obvious

By Ron Hogan

Strategy and investment consultant Peter S. Cohan examined 20 companies in several industries, including computer hardware, software and semiconductors, as well as pharmaceuticals and biotechnology, searching for the qualities that allow them to "innovate their way to success." He discovered that leading companies are driven by an entrepreneurial spirit, build or acquire the best technologies in their fields, lower the internal barriers blocking successful development and allocate their resources wisely.

The key principles of *The Technology Leaders* are straightforward, such as: "recognize the need for change," "create linkage between customer needs and product attributes" and "analyze the competition." The best material comes from the illustrative examples of how the major players operate. Many of these stories, however, will probably be familiar to industry veterans, making them of interest primarily to new entrants. The real value for readers is toward the back of the



The Technology Leaders: How America's Most Profitable High-Tech Companies Innovate Their Way to Success by Peter S. Cohan, 193 pages. Jossey-Bass, San Francisco; 1997; \$27.95.

imagining, incubating, demonstrating, promoting and sustaining a new technology in the market. One of Jolly's most significant contributions to our understanding of technology commercialization is the notion that these subprocesses are linked by intermediate stages of stakeholder mobilization and that the stakeholders can change from one subprocess to the next.

Jolly also offers advice for large corporations hoping to improve the return on investment in their technology research. He suggests that they deploy specialized, semidetached R&D units within the company and grant them the limited autonomy necessary to pursue their goals. Keeping these research units in the loop once their findings are integrated into the company's commercial strategy will enable the company to generate new technologies more quickly, allowing the innovative subculture and the larger corporate environment to thrive.

book, in an "innovation scorecard" that can be used to gauge how effectively a company enacts the technology leadership principles.

In a brief closing chapter, Cohan's fervent espousal of these core values' ability to transform the industry inspires him to outline an economic utopia straight out of *Wired* magazine's "long boom" paradigm. Cohan predicts that "the business landscape will become more efficient as technology leaders continue to make the world a better place, finding new ways to create better customer value at a lower cost."

It's a charming hypothesis, but strikingly at odds with the cutthroat methods by which leaders such as Intel do business. Like the bulk of *The Technology Leaders*, it seems harmless enough to appeal to beginners, but naïve enough to turn off industry veterans. ■

Ron Hogan (grifter@primenet.com) is the editor and publisher of the online cultural review Beatrice (www.beatrice.com/contents).



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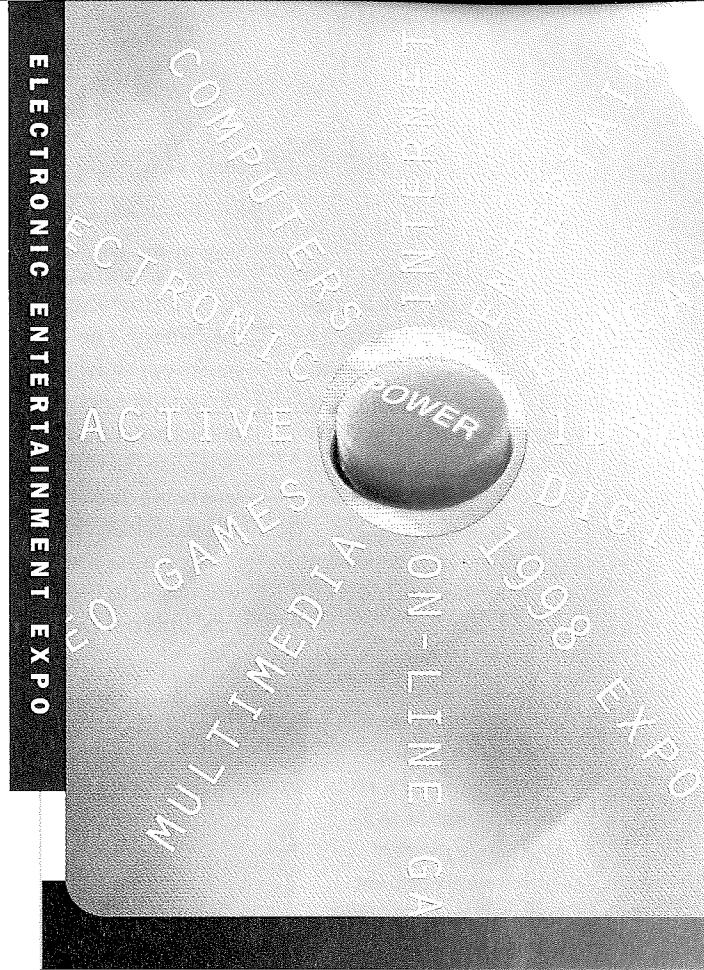
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The Contents of Discontent

By Cliff Barney

This gem of a book manages to simultaneously be an insider's look at the computer industry, a rollicking collection of bawdy tales, a serious look at the social impact of computing, a comic description of industry mores and, most importantly, a clear and honest account of a woman's response to her professional and personal environment.

Author Ellen Ullman, an independent computer programmer, holds little back in recounting her experiences. She discusses her business career, her approach to software and her sexual adventures, all with the same frank detachment. And she writes with a clarity, style and wit rarely seen, especially in the murky wilds of technojournalism. She is sure of what she knows, humble about what she doesn't, never pretentious, frequently hilarious and occasionally eloquent. The book is worth buying for the sheer pleasure of reading it. But it also has something to say.

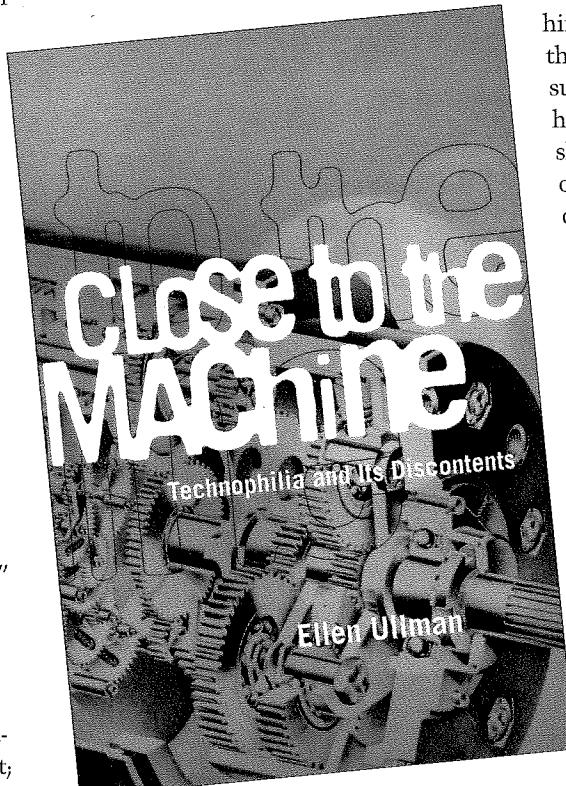
A Passion For Code

Ullman's main theme is technology's alienating effect. In its programming context, "getting close to the machine" means working with low-level code. Here, where the commands make no intuitive sense but are pure strings of 1s and 0s, the programmer loses touch with the program's purpose. The operation of the system becomes paramount; the needs of the users are forgotten. Ullman develops this theme effectively in a series of personal glimpses of her growth during two decades as a professional programmer and of her loss of a sense of purpose to what she was doing—beyond getting a system to work.

That sounds grim, but Ullman, a great storyteller, makes it into a funny and almost touching account. She takes you inside the corporate offices where she negotiates her contracts and tells you who was there, how they dressed and how they comported themselves. She also has fun mimicking the thought process of programmers as expressed in cryptic speech:

A large portion of the book is devoted to her relationship with a younger man who was among a new generation of cypherpunks out to seize control of the system of computer networks she had helped build. From him she learned how her world of spreadsheets and useful applications was being displaced by a global network of goodies dispensed by the Internet.

She realized much of her knowledge was obsolete because she didn't know new Internet languages such as Java.



Close to the Machine: Technophilia and Its Discontents by Ellen Ullman, 160 pages. City Lights Books, San Francisco; 1997; \$12.95 (paper), \$21.95 (cloth).

Now the game was not making useful products, but tweaking the system to generate money through Internet commerce or content. Compared with the programs that Ullman had written, the new interfaces (browsers) had vastly simplified controls that made users into passive acquirers.

Ullman is unnerved by the man's casual

approach to sex as well as software. As she writes, "His lovemaking was tantric, algorithmic. The sex was formulaic, had steps and positions and durations, all tried and perfected, like a martial arts kata or a well-debugged program. My own role in it was like a user-exit subroutine, an odd branch where anything might happen but from which we must return, tracing back to the mainline procedure."

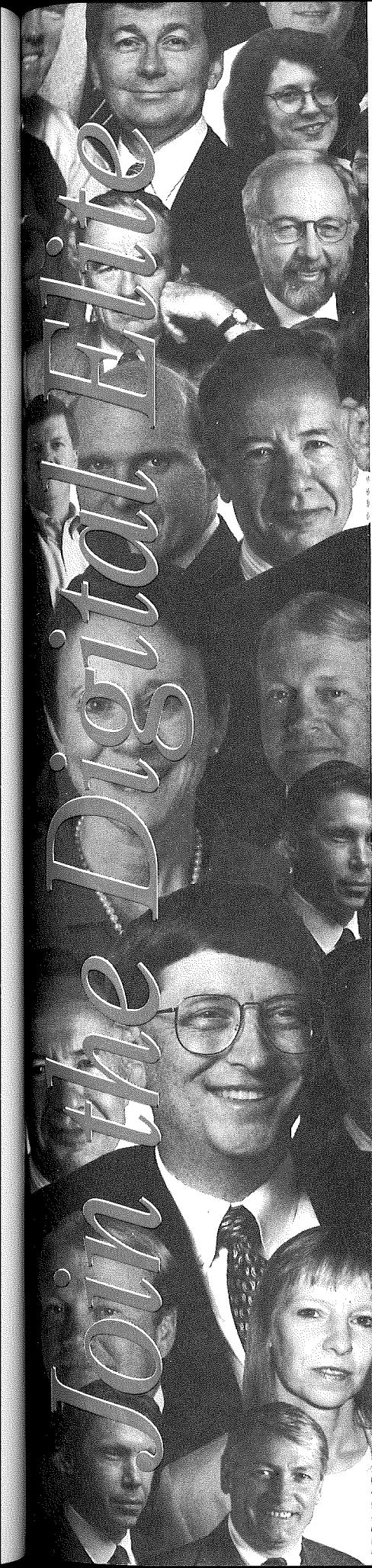
Human Operating Systems

In the end, unable to connect with him, she moves on: to the next job, the next computer language and presumably to the next lover. In revealing her private life so honestly, Ullman shows a great deal about how humans operate, how computers are made to operate and why computers can't be expected to make human decisions. She is, in fact, in the business of translating between one and the other—human desire and computer execution—her worm's-eye point of view puts things in perspective.

The computer, Ullman points out, "cannot simultaneously do something and withhold for later something that remains unknown." Only a human can do that. "The computer is not really like us. It is a projection of a very slim part of ourselves: that portion devoted to logic, order, rule and clarity."

As Ullman makes clear, she (like all of us) has more than logic, order, rule and clarity in her life, and this humanistic spirit infects her tales of tangled technology with a kind of subversive deadpan humor. *Close to the Machine* poses no problems, offers no solutions and urges no action. It offers a point of view—familiar yet somehow reassembled—described with a high degree of art. The book is sure to become a minor classic. ■

Cliff Barney (cbarney@upside.com) is a veteran journalist who has covered technology for three decades. He is a former Silicon Valley bureau manager for *Electronics* magazine. His most recent story for *UPSIDE* was "Bewildered New World" in November 1997.



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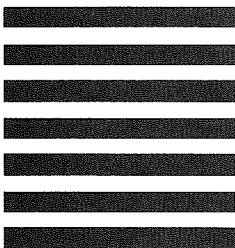
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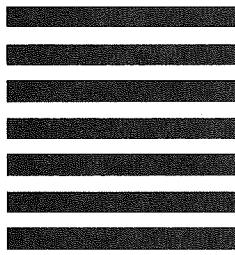
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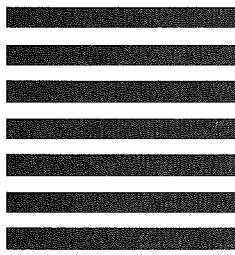
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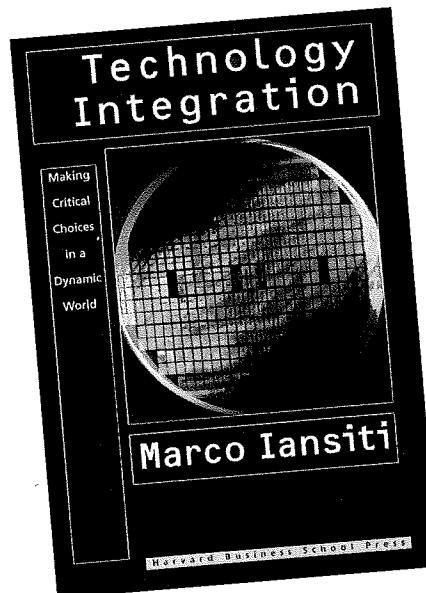
The Game's Not Over

By Stephen E. DeLong

The premise of this book is simple: In a rapidly changing environment, traditional R&D is doomed. The alternative is technology integration, not to replace R&D but to "leverage both capabilities by managing their interaction." The best way to achieve that is to design a process: create teams with basic knowledge, developmental ability and implementation experience; make sure they receive input from end users and marketing; allow them to iterate and experiment often using that input; and make sure they expect change.

Iansiti's background—he holds a doctorate in solid-state physics and is on the faculty at Harvard Business School— informs this unusual book. As a research monograph and a management primer, it can be read by disparate audiences.

On the research side, it summarizes Iansiti's six-year study of more than 100



Technology Integration: Making Critical Choices in a Dynamic World by Marco Iansiti, 249 pages. Harvard Business School Press, Cambridge, Mass.; 1997; \$35.

R&D projects in the United States, Europe and Japan in four areas: mainframes, semiconductors, workstations and Internet software. He explains the fieldwork, performance and outcome measures used to evaluate the effectiveness of each project.

On the management side, companies that emphasize process over product are generally more successful than those that do not. The names that emerge from Iansiti's analysis are not surprising: Intel, IBM, Microsoft, Netscape, Yahoo. But this list arises from an independent assessment tool.

Is his methodology capable of "predicting" corporate behavior? There is a good chance. ■

Stephen E. DeLong (delong@popa.fab.albany.edu) is associate vice president for academic affairs in the Office of Information Systems and Technology, University at Albany/SUNY.

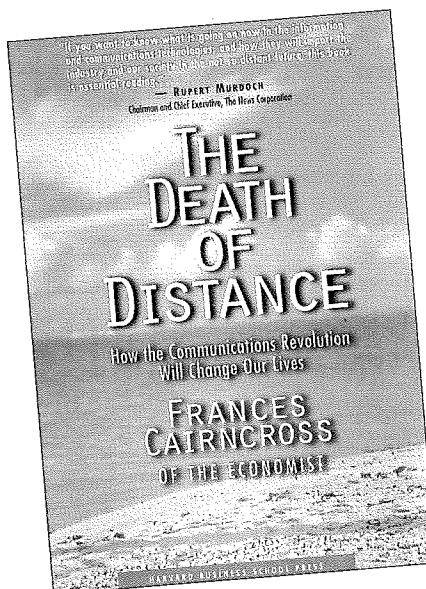
Technology 1, Time/Space 0

By Michael Pellecchia

The death of distance as a determinant of the cost of communicating will probably be the single most important force shaping society in the first half of the next century," proclaims author Frances Cairncross. A respected journalist, she explores the implications of the communications revolution:

- ◆ Push technologies will help vendors place their brands in front of others and ahead of the competition.
- ◆ Entertainment will be the most lucrative industry on earth.
- ◆ E-commerce will make it easier to find buyers but harder to achieve fat margins.
- ◆ Nations will have to "buy" rich citizens by bidding down tax rates. Simultaneously, all governments will face tax erosion.

Her panoramic view is clearly stated in measured, well-founded aphorisms. A book like this is worth any two from Faith Popcorn or John Naisbitt. Rather than forecasting changes in television that affect the consumer, for example,



The Death of Distance: How the Communications Revolution Will Change Our Lives by Frances Cairncross, 320 pages. Harvard Business School Press, Cambridge, Mass.; 1997; \$24.95.

Cairncross probes into who will control the medium. Digital compression will create room for more channels, businesses will have their own networks, and content will be dictated by distributors and rights owners.

In a more prosaic section, Cairncross also observes that some technology doesn't appear to affect productivity.

The book is more successful than most futurist tomes in enumerating the possible influence of technology on commercial society. It points out the glacial shift under way in how businesses in countries large and small, rich and poor, free and oppressed, relate to other businesses and to individuals.

This book is highly recommended, especially for anyone interested in marketing and global markets. ■

Michael Pellecchia is proprietor of Money Blows (www.moneyblows.com). His reviews also appear in the *Minneapolis Star Tribune*.

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Firms Buying Way to Enterprise Suites

By Paul Crisci

Industrial Enterprise Applications (IEA) continues to be one of the hottest segments in the software industry. Whether measured by total market-value appreciation, the number of successful IPOs or the emergence of hot new private companies, IEA surpassed all expectations in 1997. But what also emerged in 1997 was the reaffirmation that M&A—once considered taboo in enterprise software because of the difficulty in integrating complex software technologies from different companies—is now an established tool used by IEA vendors to execute corporate strategy.

In fact, three M&A themes emerged in 1997 that will shape the competitive landscape for years to come: front-office/back-office convergence; the building of supply-chain management application suites; and the emerging battle for the enterprise resource planning (ERP) middle market.

Front-Office/Back-Office Convergence

When we last wrote about IEA in December 1996, we predicted that front-office leaders, including Vantive Corp. in customer support and Siebel Systems Inc. in sales-force automation (SFA), would whet the acquisition appetites of their larger and more established back-office brethren, such as Baan Co. NV and Oracle Corp. Indeed, one of 1997's largest IEA deals was Baan's acquisition of SFA vendor Aurum Software Inc. for \$275 million. With a strong sales force of its own and a new pipeline of deal flow from Baan customers demanding SFA, Aurum should provide a nice return on investment to its parent. And Baan will not rest on its laurels, as it has moved aggressively with two additional deals, combining European

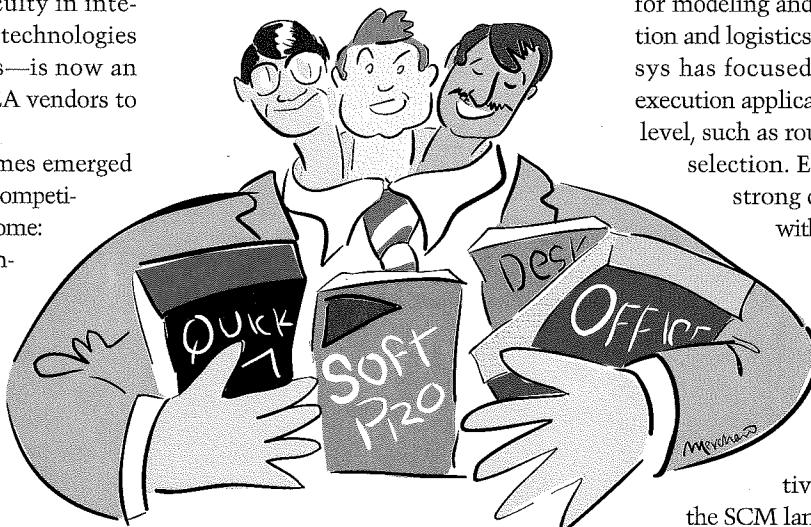
SFA provider Matrix Holding BV and product-configuration vendor Beologic A/S with Aurum.

As expected, the other major ERP vendors are challenging Baan's entrance into the front office. Oracle has committed to developing its own front-office suite, announcing a number of new, fully integrated products with rollout

I2 Technologies Inc. and Manugistics Group Inc. have achieved the most market visibility and have built the widest array of products across the supply-chain spectrum; there are several other private SCM companies gaining significant mass and momentum, including InterTrans Logistics Solutions (ITLS), Caps Logistics Inc. and Metasys Inc. ITLS and Caps have developed key high-end functionality for modeling and optimizing transportation and logistics networks, while Metasys has focused on management and execution applications at the operational level, such as route and low-cost carrier selection. Each company has built strong customer relationships with Fortune 100 companies and has established an active presence in the market through partnerships and alliances.

Vertical and horizontal acquisition activity is rapidly reshaping the SCM landscape. Vendors' strategies are being driven by customers demanding fully integrated solutions that incorporate all facets of the supply-chain spectrum, from advanced planning and scheduling (APS) through transportation management systems to warehouse management. Consequently, partnerships and M&A activity have been furious as the SCM vendors race to capture market share.

One notable trend has been the entrance of APS vendors into new vertical markets, highlighted by I2's acquisitions of Think Systems Corp. for \$147 million and Optimax Systems Corp. for \$52 million. Think Systems gives I2 a major presence in the consumer packaged goods market, placing the company squarely in the core market of its chief nemesis, Manugistics; Optimax provides I2 with APS software for the automotive and



plans to its sales force by spring 1998. The database giant expects to fill out its front-office applications with field-service and customer-support modules later in the year. In early November, SAP AG announced its intention to enter the SFA market with its organically developed solution, and finally, PeopleSoft Inc. and Vantive continue to strengthen their relationship with the announcement of their jointly developed and marketed field-service software.

The Emergence of Supply-Chain Management

By any measure, the darling of IEA in 1997 was supply-chain management (SCM). A \$419 million market today, SCM is expected to reach \$2.7 billion by 2001. While



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heavy-equipment industries.

There has also been high activity among smaller, privately held companies as they look to fill out their application suites and build critical mass for an IPO. Logility Inc. acquired Distribution Sciences Inc. to bolster its transportation management functionality along with its existing APS and warehousing applications. The move came a few months before Logility's November IPO. Demand-chain vendor Descartes Systems Group Inc. purchased transportation vendor Roadshow International Inc. in November 1997 for \$55 million and filed for an IPO two weeks later. The merger of two of Pinnacle Automation Inc.'s software divisions, warehousing vendor McHugh Freeman and transportation vendor Weseley Software, created McHugh Software International Inc. The combined company, with an estimated \$70 million in sales, offers a fully integrated SCM solution. Look for deal activity to stay high as ERP vendors continue to enter the segment and private companies seek to cash in on red-hot SCM valuations.

Supply-Chain ... Movement

Ultimately, these integrated supply-chain suites will be merged onto the backbones of the major ERP vendors, becoming a key feature of a broader front-office/back-office solution. In fact, many vendors have already begun this process through product announcements and partnerships. Baan's first generation of SCM applications, called Baan Sync, is based on optimization technology acquired through Berclain Inc. and should be ready for delivery with Baan V in the first half of 1998. Look for Baan to make an acquisition in the SCM space in early to mid-1998, most likely in the APS or transportation management areas, as it seeks to bolster network modeling and optimization functionality in Sync.

As expected, Oracle and I2 embarked on a joint development and sales partnership to sell I2's SCM software and Oracle's ERP applications to new and existing customers in specific vertical segments. More announcements from this alliance, as well as new products, are expected in early 1998. Oracle has now partnered with both major SCM players, I2 and Manugistics, and is planning to allocate significant sales resources toward these partnerships.

Middle-Market ERP: The Next Major Battleground

As the high-end of the ERP market continues to saturate (an estimated 70 percent of Fortune 500 companies have committed to an ERP system), many industry analysts are looking to the middle market as the next ERP growth engine. Generally characterized by companies with revenues between \$50 million and \$500 million, the middle tier represents a \$3 billion market today and is expected to grow 50 percent per year through 2000.

Moving downstream will not be easy for the high-end players. Historically focused on the Unix platform, they depend heavily on third-party integrators, and their products require long implementation periods. Conversely, middle-market customers, who are choosing Windows

Despite significant strides in growing market share at the high end, Oracle's allegiance to its Unix-based database products and its tendency to partner with best-of-breed vendors may not fare well in the middle market, where Windows NT and tight, end-to-end application integration will dominate. Among the other vendors, SAP's first attempt to produce a "stripped-down" version of R/3 has received a lukewarm reception, while PeopleSoft, under CEO David Duffield, in October recently set up an entire division to attack the middle market.

Established middle-market leaders include J.D. Edwards & Co. and QAD Inc., both of which are already larger than many IEA public companies and have the market presence to command sizable valuations. Armed with strong currencies, both companies are well-positioned to act as consolidators in the middle market, perhaps acquiring a pure-play Windows NT vendor because both must seek new growth vehicles to complement their legacy platforms (Edwards in AS/400 and QAD in Unix).

Finally, don't underestimate commonly overlooked Platinum Software Corp., which under the leadership of turnaround artist George Klaus has become a solid pure-play Windows NT application vendor. In some respects the "Baan of the middle market," Platinum is strongly committed to building a complete middle-market front-office/back-office solution through acquisitions. This is exemplified by its recent additions of Clientele Software Inc., a customer support and SFA applications provider, for \$11 million in June 1997, and FocusSoft Inc., a Windows NT-based manufacturing and distribution-software provider, for \$26 million in November 1997.

Last year was another strong year for IEA, characterized by red-hot SCM valuations and the continued emergence of M&A as a critical time-to-market advantage in building application suites. This year should see more acquisitions as the ERP backbone integrates front-office and supply-chain applications and vendors fight to control the middle market. ■

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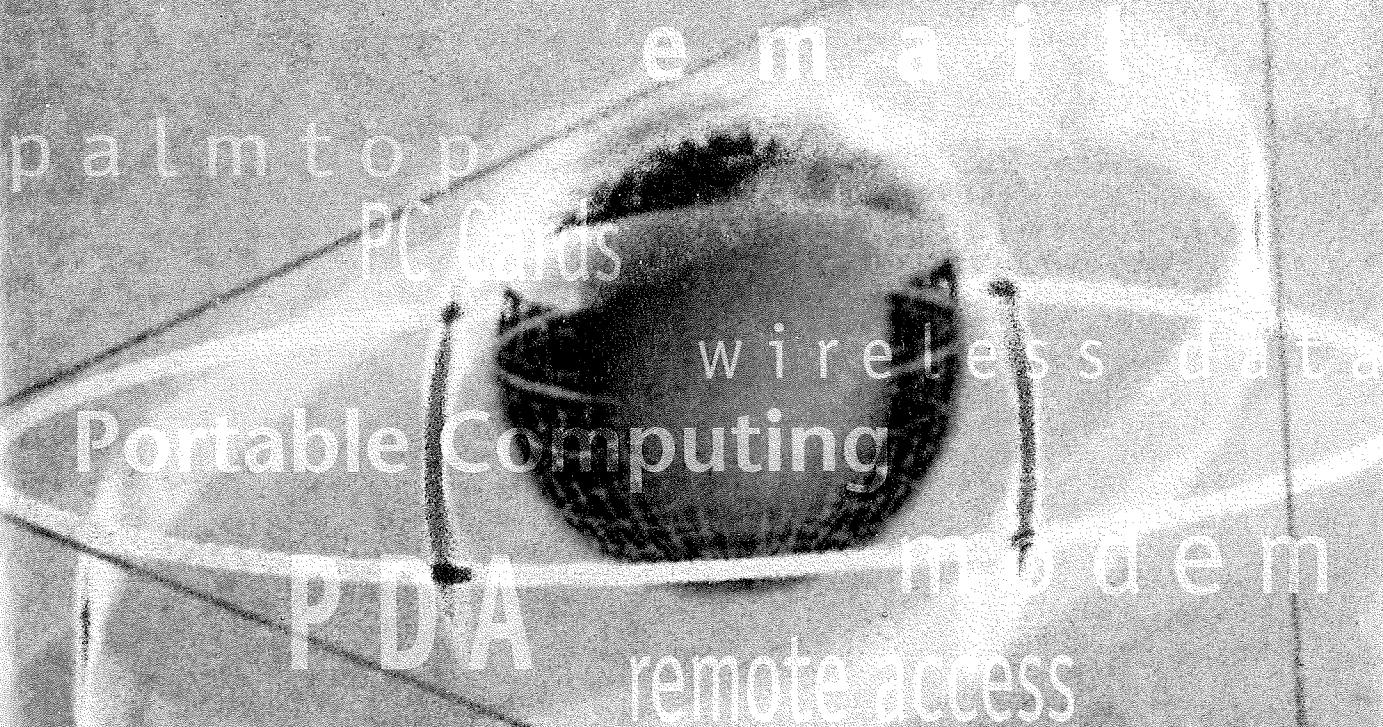
the middle market.

NT in increasing numbers, cannot afford expensive third-party implementation services and do not possess the IS infrastructure to manage long implementations.

Still, most large players have announced efforts to move downstream. Baan has been the most successful because of its early adoption of Windows NT and its strength in manufacturing applications. The company's recent acquisition of Siemens AG's middle-market ERP business is another indication of its interest in dominating this segment. Expect Baan to accelerate its entry into the middle market through acquisitions that add to its midtier customer base and distribution capabilities.

Paul Crisci (pcrisci@broadview.com) is a principal in Broadview Associates' Silicon Valley office. Broadview analyst Suresh Khanna also contributed to this article.

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How to Value Internet Stocks

By Steve Harmon

The reason legendary investor Warren Buffett doesn't make technology investments is because he admits he doesn't understand it. Despite the fact that he and Bill Gates play cards together, Buffett is not a Microsoft Corp. investor.

If old-line players on Wall Street don't understand technology stocks, how does anyone make sense of Internet stocks, which popped up a short three years ago?

Despite the tendency of a few analysts to wholeheartedly make claims and target share prices like Nostradamus calling the Psychic Friends Network, we prefer to examine a few key metrics and place them in the context of the whole before giving a thumbs up or down on a stock or company. Here's a snapshot of a few elements we think are important to consider when valuing Internet stocks:

◆ **Management.** A bad captain and great ship make for rough waters no matter how pretty the sail. With the Internet, it's often those coming from the online world who can leverage it better than those who jump onboard later and try to force a square peg into a round hole.

◆ **Barriers to entry.** It's often said that duplicating any company's game plan is easy on the Web: Two guys or gals in a garage can do it. That sounds good in the 10,000 business plans bombarding Sand Hill Road every day, but in reality, Web Street is a

tough neighborhood.

We estimate it would take a company with at least \$1 billion in revenue to even touch Yahoo Inc.'s global accomplishments thus far. In our minds, its brand equity alone may be worth more than \$400 million. For 25 million people a month, Yahoo is the Internet. By comparison, Microsoft spent more than \$250 million just to promote Windows 95 when it first shipped.

◆ **Timing.** The perfect product at the wrong time is useless. Remember home banking in the 1980s? Financial institutions touted this as the Second Coming of bean counters—pay your bills online. The trouble was that nobody was online at 1980's baud rates. ◆ **Access to capital.** The record number of Internet IPOs and record amount of venture capital pouring into Internet companies is occurring for one reason: This industry moves up to 10 times faster than any other, and capital keeps the lights and modems whirring. Money buys the sales and marketing force, the management talent, the development folks and the market presence to make an Internet startup successful and visible.

◆ **Ratios and percents.** There are numerous ways to value a company. One is to take overall future market-segment revenue and apportion a certain amount to a company. For example, if we estimate that 300 million people may be on the Web in 2005 and America Online Inc. maintains its position

as access leader (we estimate it accounts for about 10 percent of all people in the world on the Internet—10 million people out of a global 100 million on the Web in 1998), then that implies an AOL subscriber base of 30 million in seven years.

The more traditional ways of looking at stocks apply to Internet stocks, too. However, because few early-stage Internet companies have earnings, revenue and revenue growth are extremely important.

Most of what we just outlined is straight from Buffett's bonanza bag. Because at the end of the day, whether it's Coca Cola Co. or Amazon.com Inc., it's still business. And that means selling goods and making money. ■

Steve Harmon is vice president of business development for Mecklermedia Corp. (www.internet.com).

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Movers and Shakers

Opening for Netscape?

Microsoft Corp. (Nasdaq: MSFT) contends that appointing a "special master" to oversee the antitrust case against it was not proper. We don't have a problem with Microsoft merging Windows with Internet Explorer. In fact, two years ago we believed the desktop and PC were on a convergent course, so the browser becoming part of the operating system is not unexpected.

It's the "must carry" nature of Inter-

net Explorer on Windows machines that's bothersome to us. In the testing phase, Internet Explorer 4.0 seemed to interweave the OS and the Net. The final version of 4.0 is weaker in that regard. **Netscape Communications Corp.** (Nasdaq: NSCP) has an opening here for power deals with PC makers and corporations. Maybe it should take a page from Microsoft marketing whiz Steve Ballmer's playbook.

E-Trade's Buyback

E-Trade Group Inc. (Nasdaq: EGRP) said in December that it would buy back up to 2 million shares on the open market or privately. As of Dec. 29, the company had 37.7 million shares outstanding. We think the move takes advantage of the stock's softness following the October market frenzy that reportedly left some of E-Trade's customers unable to trade in a timely manner.—S.H.

December's Year-End Doldrums

Internet stock investors can take one foot down from the windowsill, but based on this month's ISDEX performance they probably aren't walking away from the window yet. The ISDEX took a 6.9 percent drop in December, compared

with a 13.10 percent drop in November. The ISDEX again outpaced the Nasdaq (down 5.5 percent) and the Dow Jones Industrial Average (down 0.8 percent); the S&P 500 pulled out of its nosedive, gaining 2.2 percent in December.

Yahoo gained ground on the market with a 22 percent climb, joining **America Online** and **@Home** as December's ISDEX starlets. **Netscape's** news was bad, down 14 percent, but not as bad as last month, when its share price fell 25 percent. Similarly, **Open Market** and **E-Trade** managed to decelerate, but not to stop, their plunges—too bad E-Trade's rosy quarterly report (Q1 98, ending Dec. 31, 1997) couldn't have come sooner. And last month's bright spot, **Check Point Software**, turned its 20 percent rise into an equally speedy 25 percent drop. Keep your fingers crossed for next month. —Tish Williams

INDEX COMPARISONS

Index	12/22/97 Close	11/21/97 Close	Point Change	% Change From Nov.-Dec. 1997	12/31/96 Close	% Change From Dec. 1996-Dec. 1997
ISDEX Average	93.26	100.17	-6.91	-6.90%	99.5	-6.30%
Nasdaq	1,532.06	1,620.75	-88.69	-5.50%	1,287.92	19.00%
DJIA	7,819.31	7,881.07	-61.76	-0.80%	6,509.39	20.10%
S&P 500	953.7	933.09	20.61	-2.20%	748.76	27.40%

Company	Symbol	12/22/97 Close	11/21/97 Close	Price or Point Change	% Change Nov.-Dec. 1997	12/31/96 Close or IPO *	% Change Dec. 1996-Dec. 1997
Amazon.com *	AMZN	\$56.38	\$53.88	\$2.50	5%	\$18.00	213%
America Online	AOL	\$90.00	\$74.88	\$15.13	20%	\$33.25	171%
@Home Network *	ATHM	\$26.81	\$19.06	\$7.75	41%	\$10.50	155%
Check Point Software	CHKPF	\$36.38	\$48.63	(\$12.25)	-25%	\$21.75	67%
CKS Group	CKSG	\$13.25	\$13.94	(\$0.69)	-5%	\$27.88	-52%
CMG Info	CMGI	\$27.94	\$21.75	\$6.19	28%	\$16.75	67%
CNET	CNWK	\$28.75	\$24.25	\$4.50	19%	\$29.00	-1%
Connect	CNKT	\$1.13	\$1.38	(\$0.25)	-18%	\$6.13	-82%
CyberCash	CYCH	\$13.75	\$15.75	(\$2.00)	-13%	\$23.00	-40%
E-Trade	EGRP	\$19.63	\$24.03	(\$4.41)	-18%	\$11.50	71%
EarthLink Network *	ELNK	\$22.69	\$19.00	\$3.69	19%	\$16.81	35%
Excite	XCIT	\$26.00	\$26.03	(\$0.03)	0%	\$10.25	154%
Forefront	FFGI	\$8.31	\$8.00	\$0.31	4%	\$5.50	51%
Individual	INDV	\$3.25	\$3.84	(\$0.59)	-15%	\$6.00	-46%
Infoseek	SEEK	\$8.56	\$11.50	(\$2.94)	-26%	\$7.75	10%
Lycos	LCOS	\$38.13	\$30.63	\$7.50	24%	\$10.50	263%
Mecklermedia	MECK	\$23.25	\$22.50	\$0.75	3%	\$19.75	18%
Mindspring	MSPG	\$29.88	\$28.63	\$1.25	4%	\$6.13	387%
Netcom	NETC	\$21.25	\$19.44	\$1.81	9%	\$13.00	63%
NetManage	NETM	\$2.63	\$3.06	(\$0.44)	-14%	\$6.00	-56%
Netscape	NSCP	\$25.50	\$29.75	(\$4.25)	-14%	\$56.88	-55%
Network Solutions *	NSOL	\$12.25	\$16.31	(\$4.06)	-25%	\$18.00	-32%
Onsale *	ONSL	\$14.56	\$18.00	(\$3.44)	-19%	\$6.00	143%
Open Market	OMKT	\$9.63	\$10.38	(\$0.75)	-7%	\$13.50	-29%
Open Text	OTEXF	\$10.13	\$10.75	(\$0.63)	-6%	\$6.88	47%
PSINet	PSIX	\$5.19	\$7.47	(\$2.28)	-31%	\$10.88	-52%
Quarterdeck	QDEK	\$1.53	\$2.00	(\$0.47)	-24%	\$4.13	-63%
Raptor	RAPT	\$12.22	\$14.50	(\$2.28)	-16%	\$20.13	-39%
Security Dynamics	SDTI	\$35.00	\$39.13	(\$4.13)	-11%	\$31.50	11%
Security First Network Bank	SFNB	\$7.13	\$7.63	(\$0.50)	-7%	\$10.25	-30%
Spyglass	SPYG	\$4.63	\$7.94	(\$3.31)	-42%	\$12.50	-63%
Trusted Information Systems	TISX	\$8.25	\$9.50	(\$1.25)	-13%	\$10.75	-23%
Versant Object Technologies	VSNT	\$13.13	\$16.00	(\$2.88)	-18%	\$18.63	-30%
VocalTec	VOCLF	\$18.69	\$21.63	(\$2.94)	-14%	\$5.88	218%
Yahoo	YHOO	\$64.44	\$52.88	\$11.56	22%	\$11.33	469%

*Companies that had an IPO in 1997.

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Close-up:

Semiconductor Equipment
Growth Forecast for '98

By Brett Hodess

Whenever technology stocks dip, the semiconductor equipment makers seem to get hit first, and often hardest. Concerns regarding Asian currency devaluations and memory-chip pricing, combined with swings in the overall market, caused an extraordinarily sharp decline in semiconductor equipment stocks at the end of December. However, we believe the main concern in the future will be supply and demand for chips, rather than currency issues. If chip demand is sufficient, efforts to improve chip testing and yields, to lower dynamic random access memory (DRAM) costs and to convert memory factories to foundries should enable the semiconductor equipment market to grow in 1998. Also, if European chipmakers rebound—and open their wallets—the equipment market will get an added boost.

Front-End Fab Gear vs.
Testing Gear

We believe DRAM cutbacks and the Asian financial crisis will result in slow or possibly down sequential quarters for some equipment makers. Front-end wafer fab process companies will bear the brunt of the slowdown. Orders from Korean companies have already started to slow. Dongbu, a Korean joint-venture DRAM startup, has been postponed indefinitely because of tight financing. Similarly, Hyundai Electronics Co. Ltd. and LG Semicon have postponed massive fabs planned for the United Kingdom. But we estimate that back-end areas such as test and assembly will each grow about 10 percent in 1998, while fab equipment sales will increase only 2 percent to 3 percent.

On the fab side, we expect high differentials in equipment growth rates. Deep-UV (ultraviolet lithography for 0.25-micron and below chips), CMP (chemical mechanical planarization), high-density plasma CVD (chemical-vapor deposition) and automation and process control (yield enhancement and measurement equipment) should continue to outperform the overall front end. DUV,

CMP and HDP CVD are three of the key technologies driving a rapid transition to more advanced chips, while automation and process control are productivity (i.e., cost reduction) enhancement tools. CMP and automation have been more leveraged toward logic devices (microprocessors and digital signal processors) but are beginning to be adopted for DRAMs.

Also, many DRAM companies that stopped spending on 16-megabit DRAMs

We estimate that semiconductor capital equipment spending growth will be in the 5 percent range in 1998. That's down from our previous estimate of 12 percent.

earlier in the year have begun to follow Micron Technology Inc.'s example, aggressively shrinking the size of 16-Mbit chips. This strategy is driving a sharp increase in capital equipment upgrades in existing DRAM fabs. The idea is to reduce the die size by moving from 0.35-micron to as low as 0.25-micron, thereby cutting costs so as to remain profitable, even as 16-Mbit DRAMs hit sub-\$3 spot-market pricing. Numerous Korean, Japanese and Taiwanese memory suppliers are taking this route. We believe the upgrades will drive substantial bookings growth in the near term for equipment companies.

Test-equipment makers will benefit from a major upgrade cycle for logic, mixed-signal and memory testers that is well under way.

New gear is needed to test high-speed integrated circuits that cannot be handled by the current installed base of slower-speed testers.

Finally, as DRAMs remain in overcapacity, many memory makers may try to convert their fabs in order to subcontract chip manufacturing for other suppliers.

Our Growth Forecast

Based on the Korean financial crisis, the DRAM oversupply situation, findings from our recent visit to Asia for Semicon Japan and our subsequent meetings with numerous semiconductor and semiconductor capital equipment companies, we estimate that semiconductor capital equipment spending growth will be in the 5 percent range in 1998. That's down from our previous estimate of 12 percent.

We estimate that Korean investment will decline about 25 percent in 1998, with Japan flat and Taiwan up 12 percent rather than 15 percent to 20 percent. Our U.S. and European estimates remain unchanged. The overall impact of the slower growth rate reduces our 1998 estimated equipment market sales by 6 percent to 7 percent, or slightly less than \$2 billion in total.

Valuation and Investment Opinion

We believe the majority of the bad news is already in the stocks. During periods of uncertainty, price-to-sales has been a better indicator than price-to-earnings for this group. On a historical valuation basis, if the group maintains operating margin profitability in the 10 percent and greater range, as we expect it to through 1998 (group average is about 12 percent currently), we don't believe the group will trade much below two times the 1998 market-cap-to-sales. The long-term average price-to-sales has been 2.1 times for the group. ■

Brett Hodess is a managing director and senior research analyst in the technology group at NationsBanc Montgomery Securities. He can be reached at bhodess@montgomery.com.

Net Stocks Brighten Dark December

UPSIDE's Online/Internet Services sector ran ahead of the pack, which seemed mostly to want to run the wrong way in December. Yahoo Inc. was the front-runner overall, with a nearly 39 percent gain. Lycos Inc. and money-sieve CNET Inc. also helped push the online sector into the lead, with gains of 33.3 percent and 31.9 percent, respectively. Ironically, the Online/Internet stock sector is also the only one with a nonexistent price-to-earnings ratio.

—Michael Mattis

SECTOR COMPARISONS					
Sector	% Change in Stock Price 1 Month	Rank % Change 1 Month	% Change in Stock Price 12 Months	Rank % Change 12 Months	Average Trailing P/E
Online/Internet Services	11.5%	1	126.8%	1	NA
Content (Media)	8.0%	2	35.8%	4	27.5
Wired Communications Networks	5.5%	3	51.9%	2	27.4
Distributors/Integrators & Data Serv.	4.0%	4	20.7%	5	40.2
Design Automation Software	-4.1%	5	-6.7%	11	53.6
Software Applications & Tools	-5.0%	6	5.1%	9	59.2
Computer Systems	-5.5%	7	36.0%	3	30.8
Wireless Communications Networks	-5.8%	8	16.5%	6	42.6
Communications Equipment	-7.5%	9	-9.5%	12	36.6
Content (Software)	-8.1%	10	6.7%	8	32.2
Semiconductor Equipment	-11.2%	11	9.8%	7	24.9
Semiconductors	-14.1%	12	-11.9%	13	25.3
Peripherals	-20.0%	13	-1.5%	10	17.7

TOP 10 GAINERS			
1. Yahoo Inc.	YHOO	38.9%	
2. Arbor Software Corp.	ARSW	34.7%	
3. Lycos Inc.	LCOS	33.3%	
4. HNC Software Inc.	HNCS	32.5%	
5. NextLevel Systems Inc.	NLV	32.1%	
6. CNET Inc.	CNWK	31.9%	
7. Intuit Inc.	INTU	30.0%	
8. Mobile Telecom. Tech. Corp.	MTEL	28.8%	
9. Gartner Group Inc.	GART	26.6%	
10. Paychex Inc.	PAYX	26.2%	

TOP 10 LOSERS			
1. Electronics For Imaging Inc.	EFII	-67.4%	
2. Remedy Corp.	RMDY	-51.6%	
3. Hughes Electronics Corp.	GMH	-44.4%	
4. Informix Corp.	INFX	-38.7%	
5. System Software Assoc. Inc.	SSAX	-38.2%	
6. Cabletron Systems Inc.	CS	-36.2%	
7. Kulicke & Soffa Ind. Inc.	KLIC	-33.6%	
8. Oracle Corp.	ORCL	-32.8%	
9. Zoran Corp.	ZRAN	-32.5%	
10. 3DO Co.	THDO	-31.6%	

Company	Ticker	Closing Stock Price 12/30/97	Percent Change Current Price from		EPS		P/E		Last 4Qs Rev. (\$M)	Last 4Qs Net Income (\$M)	Current Market Cap. (\$M)	Market Cap. Change over 12 Months (\$M)	Market Cap./4Qs Rev.
			1 Month Ago	12 Months Ago	Last 12 Months	Projected CY 1997	Last 12 Months	Projected CY 1997					
COMPUTER SYSTEMS													
Apple Computer Inc.	AAPL	\$13.19	-25.7%	-43.0%	(\$8.29)	\$0.16	NM	110.9	\$7,081	(\$1,045)	\$1,687	(\$1,192)	0.2
Compaq Computer Corp.	CPQ	\$54.75	-12.3%	82.2%	\$2.19	\$2.65	25	23.6	\$22,683	\$1,650	\$41,446	\$21,102	1.8
Data General Corp.	DGN	\$17.63	-1.7%	16.5%	\$1.26	\$1.44	14	12.5	\$1,533	\$56	\$720	\$128	0.5
Dell Computer Corp.	DELL	\$85.06	1.0%	204.1%	\$2.31	\$2.52	36.7	33.4	\$11,002	\$847	\$27,731	\$17,894	2.5
Digital Equipment Corp.	DEC	\$37.25	-24.4%	-2.3%	\$1.28	\$2.49	29.1	19.8	\$13,096	\$232	\$5,505	(\$400)	0.4
Gateway 2000 Inc.	GTW	\$34.38	19.6%	23.3%	\$0.67	\$1.31	51.3	21.9	\$5,870	\$105	\$5,296	\$1,021	0.9
Hewlett-Packard Co.	HWP	\$61.56	0.7%	19.3%	\$2.95	\$3.45	20.9	17.7	\$42,895	\$3,119	\$63,958	\$11,465	1.5
IBM Corp.	IBM	\$103.13	-5.8%	33.0%	\$5.99	\$6.17	17.2	17.7	\$77,928	\$6,023	\$100,255	\$19,971	1.3
NCR Corp.	NCR	\$27.63	-6.4%	-21.9%	(\$0.21)	\$0.08	NM	NA	\$6,637	(\$22)	\$2,837	(\$736)	0.4
Silicon Graphics Inc.	SGI	\$12.00	-8.6%	-52.9%	\$0.24	\$0.92	50	14.3	\$3,665	\$45	\$2,247	(\$2,214)	0.6
Sun Microsystems Inc.	SUNW	\$104.63	12.8%	43.8%	\$1.92	\$2.26	21.2	15.9	\$8,838	\$747	\$15,219	\$4,843	1.7
Tandy Corp.	TAN	\$37.63	-12.8%	65.4%	(\$0.40)	\$1.72	NM	25.1	\$5,716	(\$47)	\$3,921	\$1,239	0.7
Unisys Corp.	UIS	\$13.31	-7.4%	101.0%	\$0.31	\$0.43	42.9	33.4	\$6,549	\$168	\$2,341	\$1,182	0.4
PERIPHERALS													
American Pwr. Conv. Corp.	APCC	\$23.38	-23.0%	-14.2%	\$1.20	\$1.25	19.5	24.3	\$832	\$115	\$2,223	(\$333)	2.7
Diebold Inc.	DBD	\$49.75	7.7%	19.4%	\$1.68	\$1.76	29.6	26.2	\$1,180	\$116	\$3,431	\$564	2.9
Electronics For Imaging Inc.	EFII	\$15.75	-67.4%	-59.9%	\$1.56	\$1.69	10.1	28.6	\$389	\$87	\$826	(\$1,177)	2.1
EMC Corp.	EMC	\$27.00	-10.9%	61.2%	\$0.97	\$1.02	27.8	29.7	\$2,721	\$497	\$13,390	\$5,596	4.9
Iomega Corp.	IOM	\$25.00	-24.2%	43.9%	\$0.74	\$0.88	33.8	37.5	\$1,590	\$100	\$3,248	\$1,044	2
Komag Inc.	KMAG	\$14.06	-29.9%	-47.7%	(\$0.29)	\$0.41	NM	48.9	\$613	(\$15)	\$738	(\$643)	1.2
Quantum Corp.	QNTM	\$20.44	-23.2%	45.3%	\$2.46	\$2.59	8.3	10.3	\$6,041	\$340	\$2,783	\$1,155	0.5
Read-Rite Corp.	RDRT	\$15.81	-17.3%	-38.0%	\$1.87	\$2.32	8.5	8.2	\$1,162	\$91	\$757	(\$435)	0.7
Seagate Technology Inc.	SEG	\$19.44	-14.3%	-51.6%	\$1.17	\$0.84	16.6	27	\$8,775	\$288	\$4,754	(\$3,840)	0.5
Storage Technology Corp.	STK	\$61.31	-5.3%	30.1%	\$3.54	\$3.70	17.3	17.5	\$2,101	\$216	\$3,762	\$1,087	1.8
Western Digital Corp.	WDC	\$15.25	-24.5%	-46.6%	\$3.18	\$1.15	4.8	17.6	\$4,385	\$297	\$1,310	(\$1,208)	0.3
Xerox Corp.	XRX	\$72.06	-7.2%	39.9%	\$3.95	\$3.96	18.2	19.6	\$17,829	\$1,353	\$23,485	\$6,771	1.3
COMMUNICATIONS EQUIPMENT													
ADC Telecommunications Inc.	ADCT	\$42.94	15.5%	32.1%	\$0.83	\$0.93	51.7	40	\$1,164	\$109	\$5,669	\$1,451	4.9
Andrew Corp.	ANDW	\$23.38	-11.8%	-33.7%	\$1.18	\$1.39	19.8	19.1	\$869	\$108	\$2,109	(\$1,081)	2.4
Ascend Communications Inc.	ASND	\$24.00	-3.8%	-61.4%	(\$0.60)	\$1.02	NM	24.4	\$1,052	(\$131)	\$4,549	(\$2,745)	4.3
Bay Networks Inc.	BAY	\$25.75	-14.3%	21.9%	(\$1.30)	\$1.05	NM	28.6	\$2,172	(\$249)	\$5,448	\$1,467	2.5
Cabletron Systems Inc.	CS	\$14.75	-36.2%	-58.2%	\$1.56	\$1.46	9.5	15.8	\$1,476	\$244	\$2,328	(\$3,002)	1.6
Ciena Corp.	CIEN	\$60.88	12.7%	NA	\$0.85	\$1.06	71.6	50.9	\$291	\$86	\$5,982	NA	20.6
Cisco Systems Inc.	CSCO	\$84.56	-2.0%	28.9%	\$1.74	\$2.64	48.6	32.7	\$6,874	\$1,204	\$56,723	\$14,113	8.3
DSC Comm. Corp.	DIGI	\$23.88	5.8%	34.5%	\$0.88	\$0.89	27.1	25.4	\$1,521	\$104	\$2,815	\$734	1.9
ECI Telecomm Ltd.	ECILF	\$23.75	-12.6%	21.0%	\$1.59	\$1.72	14.9	15.8	\$658	\$121	NA	NA	NA
Fore Systems Inc.	FORE	\$15.19	-12.3%	-52.2%	\$0.29	\$0.30	52.4	57.7	\$419	\$29	\$1,511	(\$1,365)	3.6
Glenayre Technologies Inc.	GEMS	\$9.94	-8.6%	-53.5%	\$0.96	\$0.90	10.4	12.1	\$432	\$60	\$601	(\$679)	1.4

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NM = not material NA = not available

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STOCK TICKER

Company	Ticker	Closing Stock Price 12/30/97	Percent Change Current Price from		EPS	Projected CY 1997	P/E		Last 4Qs Rev. (\$M)	Last 4Qs Net Income (\$M)	Current Market Cap. (\$M)	Market Cap. Change over 12 Months (\$M)	Market Cap./4Qs Rev.	
			1 Month Ago	12 Months Ago			Last 12 Months	Projected CY 1997						
COMMUNICATIONS EQUIPMENT (CONT.)														
Harris Corp.	HRS	\$45.00	-5.1%	31.9%	\$2.69	\$2.94	16.7	16.1	\$3,893	\$213	\$3,592	\$932	0.9	
Lucent Technologies Inc.	LU	\$80.69	0.7%	69.4%	\$0.84	\$2.80	96.1	28.6	\$26,360	\$541	\$51,711	\$21,390	2	
Madge Networks NV	MADGF	\$3.94	-30.0%	-60.1%	(\$1.90)	(\$0.67)	NM	NM	\$417	(\$85)	NA	NA	NA	
Motorola Inc.	MOT	\$57.13	-9.1%	-7.3%	\$1.80	\$2.37	31.7	26.5	\$29,201	\$1,097	\$34,101	(\$2,437)	1.2	
Newbridge Networks Corp.	NN	\$34.31	-18.5%	21.5%	\$0.62	\$1.61	55.3	26.2	\$1,151	\$107	\$5,979	\$1,183	5.2	
NextLevel Systems Inc.	NLV	\$17.50	32.1%	-20.9%	\$0.08	\$0.46	NA	28.8	\$2,060	\$13	\$2,587	(\$442)	1.3	
Northern Telecom Ltd.	NT	\$88.25	-1.7%	39.8%	\$2.86	\$3.08	30.9	29.2	\$14,826	\$758	NA	NA	NA	
Pairgain Technologies Inc.	PAIR	\$19.06	-19.3%	-39.0%	\$0.65	\$0.66	29.3	35.8	\$271	\$49	\$1,307	(\$673)	4.8	
PictureTel Corp.	PCTL	\$6.63	-23.7%	-73.4%	(\$0.30)	(\$0.45)	NM	NM	\$488	(\$11)	\$226	(\$605)	0.5	
Scientific-Atlanta Inc.	SFA	\$16.94	-15.3%	5.9%	\$0.85	\$1.03	19.9	19.4	\$1,201	\$66	\$1,334	\$99	1.1	
Tellabs Inc.	TLAB	\$53.88	3.6%	36.4%	\$1.32	\$1.33	40.8	39.1	\$1,122	\$246	\$9,777	\$2,696	8.7	
3Com Corp.	COMS	\$35.88	-1.0%	-54.2%	NA	\$1.92	NA	18.9	NA	NA	NA	NA	NA	NA
Xylan Corp.	XYLN	\$15.50	-24.4%	-47.9%	\$0.49	\$0.41	31.6	50	\$188	\$23	\$663	(\$582)	3.5	
SEMICONDUCTORS														
Adaptec Inc.	ADPT	\$37.88	-23.5%	-3.2%	\$1.80	\$2.18	21	22.7	\$1,066	\$211	\$4,305	(\$19)	4	
Advanced Micro Devices Inc.	AMD	\$17.13	-21.5%	-34.4%	(\$0.21)	(\$0.14)	NM	NM	\$2,240	(\$30)	\$2,440	(\$1,251)	1.1	
Altera Corp.	ALTR	\$33.13	-29.2%	-8.9%	\$1.52	\$1.56	21.8	30	\$596	\$142	\$2,949	(\$230)	4.9	
Analog Devices Inc.	ADI	\$27.56	-12.1%	10.1%	\$1.04	\$1.36	26.5	23.1	\$1,243	\$178	\$4,446	\$565	3.6	
Atmel Corp.	ATML	\$18.31	-18.4%	-45.0%	\$1.48	-\$1.29	12.4	17.4	\$999	\$150	\$1,825	(\$1,450)	1.8	
C-Cube Microsystems Inc.	CUBE	\$16.75	-20.9%	-54.9%	\$1.33	\$1.11	12.6	19.1	\$342	\$50	\$615	(\$708)	1.8	
Cirrus Logic Inc.	CRUS	\$10.50	-20.8%	-34.4%	(\$0.46)	\$0.45	NM	29.4	\$892	(\$30)	\$708	(\$331)	0.8	
Cypress Semiconductor Corp.	CY	\$8.50	-22.3%	-41.9%	\$0.22	\$0.31	38.6	35.3	\$519	\$20	\$773	(\$406)	1.5	
Integrated Device Tech. Inc.	IDTI	\$9.44	-7.4%	-30.7%	(\$0.47)	\$0.16	NM	63.7	\$567	(\$36)	\$757	(\$306)	1.3	
Intel Corp.	INTC	\$71.69	-7.6%	5.9%	\$3.95	\$3.90	18.1	19.9	\$25,003	\$7,112	\$117,282	\$6,193	4.7	
Linear Technology Corp.	LLTC	\$56.50	-12.2%	31.4%	\$1.81	\$2.22	31.2	29	\$399	\$144	\$4,322	\$1,124	10.8	
LSI Logic Corp.	LSI	\$19.75	-15.1%	-29.1%	\$1.14	\$1.18	17.3	19.7	\$1,269	\$159	\$2,798	(\$779)	2.2	
Maxim Integrated Prod. Inc.	MXIM	\$65.75	-4.9%	49.0%	\$1.97	\$2.41	33.4	28.7	\$458	\$146	\$4,208	\$1,472	9.2	
Microchip Technology Inc.	MCHP	\$28.50	-18.6%	-11.5%	\$1.22	\$1.42	23.3	24.6	\$381	\$68	\$1,531	(\$109)	4	
Microtron Technology Inc.	MU	\$25.56	2.8%	-16.5%	\$1.54	\$1.29	16.6	19.3	\$3,515	\$332	\$5,401	(\$993)	1.5	
National Semi. Corp.	NSM	\$25.13	-24.2%	0.5%	\$1.88	\$1.84	13.4	18	\$2,600	\$292	\$3,691	\$229	1.4	
Texas Instruments Inc.	TXN	\$44.13	-11.1%	37.6%	\$1.31	\$2.09	33.6	23.7	\$9,781	\$525	\$17,220	\$5,039	1.8	
VLSI Technology Inc.	VLSI	\$22.38	-0.6%	-9.1%	(\$0.46)	\$1.25	NM	18	\$703	(\$19)	\$1,049	(\$82)	1.5	
Xilinx Inc.	XLNX	\$36.00	4.2%	-5.6%	\$1.50	\$1.65	24	20.9	\$598	\$121	\$2,664	(\$120)	4.5	
Zilog Inc.	ZLG	\$19.00	-0.7%	-29.6%	\$0.73	\$0.73	26	26.2	\$270	\$15	\$385	(\$156)	1.4	
Zoran Corp.	ZRAN	\$11.56	-32.5%	-29.9%	\$0.19	\$0.42	60.9	40.8	\$44	\$2	\$110	(\$5)	2.5	
SEMICONDUCTOR EQUIPMENT/INSTRUMENTATION														
Applied Materials Inc.	AMAT	\$30.44	-7.8%	69.7%	\$1.32	\$2.11	23.1	15.6	\$4,074	\$498	\$11,097	\$4,646	2.7	
DuPont Photomasks Inc.	DPMI	\$35.88	-7.6%	-18.9%	\$2.36	\$2.26	15.2	17.2	\$266	\$37	\$544	(\$124)	2	
Etec Systems Inc.	ETEC	\$43.63	-4.6%	18.7%	\$1.64	\$2.38	26.6	19.2	\$264	\$37	\$946	\$225	3.6	
FSI Intl. Inc.	FSII	\$11.50	-24.3%	-11.5%	\$0.20	\$0.72	57.5	21.1	\$252	\$5	\$259	(\$30)	1	
KLA Instruments Inc.	KLAC	\$38.25	-1.3%	6.3%	\$1.56	\$2.41	24.5	16.1	\$1,083	\$122	\$3,237	\$1,398	3	
Kulicke & Soffa Ind. Inc.	KLIC	\$18.31	-33.6%	-6.7%	\$1.78	\$2.39	10.3	11.5	\$502	\$38	\$425	\$44	0.8	
LAM Research Corp.	LRCX	\$29.56	-3.5%	6.1%	(\$1.76)	\$1.05	NM	29.2	\$1,010	(\$56)	\$1,116	\$266	1.1	
Novellus Systems Inc.	NVLS	\$31.06	-17.4%	8.5%	(\$3.06)	\$1.87	NM	20.1	\$476	(\$101)	\$1,046	\$121	2.2	
PRI Automation Inc.	PRIA	\$29.00	-15.0%	17.8%	\$1.08	\$1.44	26.9	23.7	\$169	\$17	\$433	\$76	2.6	
Silicon Valley Group Inc.	SVGI	\$22.81	-3.9%	15.5%	\$0.05	\$1.77	456.3	13.4	\$595	\$1	\$704	\$108	1.2	
Tektronix Inc.	TEK	\$39.38	-6.1%	15.0%	NA	\$2.62	NA	16	NA	NA	NA	NA	NA	
Teradyne Inc.	TER	\$31.94	-2.7%	32.4%	\$0.97	\$1.47	32.9	22.3	\$1,116	\$84	\$2,676	\$676	2.4	
Ultratech Stepper Inc.	UTEK	\$20.94	-15.0%	-14.1%	\$1.12	\$1.06	18.7	23.2	\$157	\$24	\$432	(\$61)	2.7	
Varian Associates Inc.	VAR	\$49.56	-14.2%	-1.1%	\$3.66	\$3.78	13.5	15.3	\$1,426	\$116	\$1,498	(\$61)	1.1	
DESIGN AUTOMATION SOFTWARE														
Autodesk Inc.	ADSK	\$35.88	-6.7%	30.5%	(\$0.17)	\$1.34	NM	28.7	\$564	(\$8)	\$1,735	\$479	3.1	
Avant Corp.	AVNT	\$17.50	-26.9%	-44.0%	(\$0.21)	\$1.20	NM	19.9	\$133	(\$6)	\$465	(\$111)	3.5	
Cadence Design Sys. Inc.	CDN	\$24.31	-3.7%	26.3%	\$0.25	\$0.89	97.3	28.4	\$845	\$63	\$5,078	\$2,082	6	
Computervision Corp.	CVN	\$3.75	3.4%	-59.5%	(\$1.91)	(\$0.76)	NM	NM	\$339	(\$122)	\$239	(\$348)	0.7	
Dassault Systemes SA	DASTY	\$30.63	17.8%	36.9%	\$0.72	\$0.68	42.5	38.2	\$310	\$176	NA	NA	NA	
Integrated Systems Inc.	INTS	\$13.44	-13.7%	-42.5%	\$0.16	\$0.26	84	59.9	\$113	\$4	\$312	(\$222)	2.8	
Intergraph Corp.	INGR	\$9.31	-11.8%	-13.4%	(\$1.74)	(\$0.93)	NM	NM	\$1,118	(\$83)	\$448	(\$64)	0.4	
Mentor Graphics Corp.	MENT	\$9.38	-1.3%	-1.3%	(\$0.53)	\$0.03	NM	316.7	\$453	(\$34)	\$611	(\$2)	1.3	
Parametric Technology Corp.	PMTC	\$46.13	-8.8%	-122.1%	\$1.64	\$2.09	28.1	24.2	\$809	\$219	\$5,877	(\$783)	7.3	
Structural Dyn. Res. Corp.	SDRC	\$19.38	16.1%	-4.3%	\$0.62	\$1.21	31.3	13.8	\$338	\$22	\$654	(\$17)	1.9	
Synopsys Inc.	SNPS	\$37.13	-9.7%	-15.6%	\$1.34	\$1.92	27.7	21.4	\$499	\$72	\$1,932	\$160	3.9	
Wind River Systems Inc.	WIND	\$37.50	-3.4%	18.7%	\$0.58	\$0.61	64.3	63.6	\$84	\$16	\$959	\$167	11.4	
SOFTWARE APPLICATIONS AND TOOLS														
Adobe Systems Inc.	ADBE	\$40.19	-4.3%	8.3%	\$2.80	\$2.26	14.4	18.6	\$892	\$208	\$2,915	\$239	3.3	

Company	Ticker	Closing Stock Price 12/30/97	Percent Change Current Price from		EPS		P/E		Last 4Qs Rev. (\$M)	Last 4Qs Net Income (\$M)	Current Market Cap. (\$M)	Market Cap. Change over 12 Months (\$M)	Market Cap./4Qs Rev.
			1 Month Ago	12 Months Ago	Last 12 Months	Projected CY 1997	Last 12 Months	Projected CY 1997					
SOFTWARE APPLICATIONS AND TOOLS (CONT.)													
Arbor Software Corp.	ARSW	\$40.75	34.7%	53.8%	\$0.61	\$0.78	66.8	38.8	\$61	\$7	\$456	\$166	7.4
Baan Co. NV	BAANF	\$33.75	-5.6%	101.5%	\$0.32	\$0.38	NA	94.1	\$567	\$63	\$6,169	\$3,214	10.9
BMC Software Inc.	BMCS	\$65.87	1.5%	57.3%	\$1.27	\$2.08	51.9	31.2	\$632	\$136	\$6,699	\$2,486	10.6
CBT Group Plc	CBTSY	\$80.00	13.3%	45.8%	\$0.93	\$1.05	86	67.3	\$100	\$19	\$1,546	\$583	15.4
Citrix Systems Inc.	CTXS	\$74.75	4.4%	91.7%	\$1.23	\$1.45	60.8	49.4	\$97	\$36	\$2,041	\$1,012	21.1
Computer Assoc. Intl. Inc.	CA	\$53.00	1.8%	63.1%	\$0.81	\$2.04	65.2	25.5	\$4,271	\$451	\$28,981	\$11,197	6.8
Compuware Corp.	CPWR	\$32.13	-8.1%	144.8%	\$0.77	\$0.91	41.9	38.4	\$938	\$141	\$5,609	\$3,373	6
Corel Corp.	COSFF	\$1.66	-28.9%	-78.1%	(\$2.15)	NA	NM	NA	\$375	(\$130)	\$101	NA	0.3
CyberMedia Inc.	CYBR	\$15.75	-30.0%	-6.0%	(\$0.30)	\$0.60	NM	37.5	\$75	(\$4)	\$195	\$3	2.6
FileNet Corp.	FILE	\$28.75	4.8%	-3.0%	(\$0.55)	(\$0.19)	NM	NM	\$248	(\$8)	\$446	\$3	1.8
Forte Software Inc.	FRTE	\$7.31	-27.8%	-77.8%	(\$0.01)	(\$0.17)	NM	NM	\$69	\$0	\$142	(\$466)	2
Harbinger Corp.	HRBC	\$28.56	-4.8%	63.2%	(\$1.05)	\$0.56	NM	53.6	\$72	(\$20)	\$614	\$337	8.6
HNC Software Inc.	HNCS	\$41.75	32.5%	47.8%	\$0.63	\$0.57	66.3	55.3	\$79	\$13	\$816	\$320	10.3
Hummingbird Comm. Ltd.	HUMCF	\$32.13	-2.7%	9.8%	\$1.98	\$2.70	16.2	12.2	\$101	\$30	NA	NA	NA
Hyperion Software Corp.	HYSW	\$34.25	-20.5%	67.1%	\$0.70	\$1.27	48.9	33.9	\$238	\$13	\$785	\$435	3.3
Infinity Financial Tech. Inc.	INFN	\$20.50	21.5%	13.9%	\$0.34	\$0.38	60.3	44.4	\$59	\$7	\$395	\$71	6.7
Informix Corp.	IFMX	\$4.06	-38.7%	-80.8%	(\$2.45)	(\$1.60)	NM	NM	\$698	(\$373)	\$614	(\$2,556)	0.9
Intuit Inc.	INTU	\$39.25	30.0%	22.7%	\$0.26	\$0.87	151	34.7	\$592	\$13	\$1,842	\$377	3.1
Macromedia Inc.	MACR	\$8.50	-14.7%	-54.7%	(\$0.49)	(\$0.02)	NM	NM	\$98	(\$19)	\$325	(\$366)	3.3
Metacreations Corp.	MCRE	\$10.31	-13.4%	-20.7%	(\$1.40)	\$0.38	NM	31.3	\$62	(\$21)	\$242	\$87	3.9
Microsoft Corp.	MSFT	\$130.25	-8.0%	54.6%	\$2.66	\$3.23	49	43.8	\$12,193	\$3,503	\$157,171	\$56,577	12.9
NetManage Inc.	NETM	\$2.63	-8.7%	-58.4%	(\$1.08)	\$0.33	NM	8.7	\$62	(\$47)	\$115	(\$155)	1.8
Netscape Comm. Corp.	NSCP	\$26.88	-5.7%	-50.6%	(\$0.17)	\$0.46	NM	62	\$521	(\$15)	\$2,436	(\$2,160)	4.7
Networks Associates Inc.	NETA	\$52.41	14.5%	16.5%	\$1.55	\$1.73	33.8	26.4	\$307	\$83	\$2,686	\$523	8.7
Novell Inc.	NOVL	\$7.94	-14.2%	-16.4%	(\$0.22)	\$0.23	NM	40.2	\$1,007	(\$78)	\$2,772	(\$494)	2.8
Objective Sys. Int. Inc.	OSII	\$8.88	-7.8%	-63.0%	(\$0.84)	(\$0.30)	NM	NM	\$42	(\$28)	\$295	(\$473)	7.1
Oracle Corp.	ORCL	\$22.38	-32.8%	-21.7%	\$0.72	\$1.08	31.2	30.8	\$6,303	\$725	\$21,939	(\$6,244)	3.5
PeopleSoft Inc.	PSFT	\$38.19	16.7%	61.6%	\$0.28	\$0.40	NA	81.8	\$703	\$71	\$8,478	\$3,681	12.1
Rational Software Corp.	RATL	\$11.56	14.2%	-69.6%	(\$1.83)	\$0.37	NM	27.4	\$226	(\$112)	\$1,014	(\$297)	4.5
Red Brick Systems Inc.	REDB	\$6.31	-12.2%	-70.3%	(\$1.40)	(\$0.60)	NM	NM	\$41	(\$16)	\$77	(\$162)	1.9
Remedy Corp.	RMDY	\$21.13	-51.6%	-59.7%	\$0.85	\$0.95	24.9	45.9	\$120	\$26	\$595	(\$809)	5
Safeguard Sciences Inc.	SFE	\$31.63	0.2%	7.2%	\$0.65	\$0.65	48.7	48.6	\$2,046	\$21	\$989	\$104	0.5
Shiva Corp.	SHVA	\$8.38	-5.6%	-76.1%	(\$0.34)	(\$0.21)	NM	NM	\$155	(\$10)	\$247	(\$756)	1.6
Sterling Software Inc.	SSW	\$40.50	10.6%	30.6%	(\$3.45)	\$2.17	NM	16.9	\$489	(\$133)	\$1,561	\$370	3.2
SunGard Data Systems Inc.	SDS	\$30.38	17.4%	48.6%	\$0.79	\$0.95	38.4	27.2	\$803	\$69	\$2,636	\$911	3.3
Sybase Inc.	SYBS	\$13.47	-3.8%	-21.3%	\$0.24	\$0.31	56.1	45.2	\$992	\$18	\$1,075	(\$232)	1.1
Symantec Corp.	SYMC	\$20.94	-16.2%	48.2%	\$1.08	\$1.36	19.4	18.4	\$528	\$61	\$1,177	\$403	2.2
System Software Assoc. Inc.	SSAX	\$8.19	-38.2%	-19.1%	(\$0.03)	\$0.22	NM	60.2	\$430	\$1	\$351	(\$80)	0.8
Wall Data Inc.	WALL	\$14.00	-13.8%	-6.7%	\$0.16	\$0.95	87.5	17.1	\$145	\$1	\$130	(\$7)	0.9
CONTENT (SOFTWARE)													
Acclaim Entertainment Inc.	AKLM	\$3.69	-9.2%	5.4%	(\$3.21)	\$0.06	NM	67.7	\$165	(\$159)	\$183	\$9	1.1
Activision Inc.	ATVI	\$18.13	13.3%	46.8%	\$0.35	\$0.61	51.8	26.2	\$100	\$5	\$283	\$111	2.8
Broderbund Software Inc.	BROD	\$26.44	-9.0%	-16.7%	(\$0.65)	\$0.84	NM	34.6	\$191	(\$13)	\$547	(\$111)	2.9
Electronic Arts Inc.	ERTS	\$37.75	12.7%	25.3%	\$0.83	\$1.16	45.5	28.9	\$728	\$46	\$2,215	\$602	3
GT Interactive Software Corp.	GTIS	\$6.13	-25.2%	-15.5%	\$0.39	\$0.47	15.7	17.4	\$452	\$26	\$411	(\$70)	0.9
Jostens Inc.	JOS	\$23.00	-4.2%	6.4%	NA	\$1.42	NA	16.9	\$847	\$72	\$893	\$59	1.1
Learning Company Inc.	TLC	\$15.63	-13.8%	6.8%	(\$8.26)	\$1.64	NM	11.1	\$378	(\$398)	\$751	\$106	2
Pixar Animation Studios	PIXR	\$21.88	-5.7%	60.6%	\$0.47	\$0.33	46.5	70.3	\$36	\$22	\$917	\$386	NA
3DO Co.	THDO	\$2.09	-31.6%	-58.6%	\$1.48	\$0.62	1.4	4.9	\$77	\$44	\$54	(\$88)	0.7
CONTENT (MEDIA)													
BSkyB Group	BSY	\$44.50	-0.3%	-14.4%	\$1.60	\$1.52	27.8	29.4	\$2,195	\$457	\$12,758	(\$2,149)	5.8
Dow Jones & Co. Inc.	DJ	\$53.50	5.8%	55.1%	\$1.53	\$1.26	35	40.1	\$2,544	\$147	\$5,152	\$1,819	2
Dun & Bradstreet Corp.	DNB	\$30.63	9.4%	24.4%	\$0.86	\$1.80	35.6	15.6	\$2,205	\$146	\$5,224	\$1,013	2.4
Equifax Inc.	EFX	\$34.88	2.2%	11.6%	\$1.39	\$1.29	25.1	26.5	\$1,487	\$201	\$5,009	\$492	3.4
Gannett Co.	GCI	\$61.25	5.5%	62.0%	\$2.72	\$2.46	22.5	23.6	\$4,606	\$771	\$17,375	\$6,715	3.8
Gartner Group Inc.	GART	\$36.88	26.6%	-1.3%	\$0.71	\$0.96	51.9	30.3	\$511	\$73	\$3,530	\$119	6.9
Knight-Ridder Inc.	KRI	\$51.94	3.6%	32.3%	\$3.88	\$2.35	13.4	21.3	\$2,786	\$387	\$4,460	\$766	1.6
McGraw-Hill Cos. Inc.	MHP	\$72.94	6.6%	56.9%	\$5.32	\$2.88	13.7	23.8	\$3,464	\$532	\$7,221	\$2,594	2.1
New York Times Co.	NYT	\$66.00	11.2%	71.4%	\$2.37	\$2.43	27.8	24.4	\$2,816	\$236	\$6,334	\$2,610	2.2
Time Warner Inc.	TWX	\$61.81	6.1%	66.5%	(\$0.36)	(\$0.35)	NM	NM	\$13,158	\$113	\$35,635	\$21,346	2.7
Times Mirror Co.	TMC	\$60.88	2.5%	14.6%	\$2.23	\$2.27	27.3	26.2	\$3,272	\$257	\$5,387	\$128	1.6
Tribune Co.	TRB	\$61.25	8.6%	52.9%	\$2.80	\$2.30	21.9	24.5	\$2,617	\$362	\$7,530	\$2,595	2.9
Viacom Inc.	VIA.B	\$42.00	20.0%	19.1%	(\$0.74)	(\$0.24)	NM	NM	\$13,005	(\$205)	\$14,561	\$2,083	1.1
Walt Disney Co.	DIS	\$99.00	4.3%	38.9%	\$2.86	\$3.20	34.6	29.7	\$22,473	\$1,966	\$66,726	\$18,205	3
Washington Post Co.	WPO	\$488.13	7.2%	47.0%	\$23.53	\$22.61	20.7	20.1	\$1,937	\$256	\$5,112	\$1,483	2.6
ONLINE/INTERNET SERVICES													
Amazon.com Inc.	AMZN	\$58.19	17.6%	NA	(\$0.88)	(\$1.21)	NM	NM	\$90	(\$21)	\$1,388	NA	15.4

STOCK TICKER

Company	Ticker	Closing Stock Price 12/30/97	Percent Change Current Price from		EPS		P/E		Last 4Qs Rev. (\$M)	Last 4Qs Net Income (\$M)	Current Market Cap. (\$M)	Market Cap. Change over 12 Months (\$M)	Market Cap./4Qs Rev.
			1 Month Ago	12 Months Ago	Last 12 Months	Projected CY 1997	Last 12 Months	Projected CY 1997					
ONLINE/INTERNET SERVICES (CONT.)													
America Online Inc.	AOL	\$88.31	(\$1.38)	149.6%	(\$1.38)	\$0.90	NM	83.3	\$1,857	(\$126)	\$9,022	\$5,703	4.9
CNET Inc.	CNWK	\$27.38	31.9%	9.5%	(\$1.36)	(\$1.69)	NM	NM	\$29	(\$18)	\$372	\$41	12.7
CompuServe Corp.	CSRV	\$12.63	-1.0%	23.2%	(\$0.53)	(\$0.07)	NM	NM	\$830	(\$50)	\$1,169	\$220	1.4
CyberCash Inc.	CYCH	\$12.81	-18.0%	-47.4%	(\$2.69)	(\$2.36)	NM	NM	\$3	(\$29)	\$141	(\$119)	55.8
Excite Inc.	XCIT	\$30.38	18.4%	196.3%	(\$2.73)	(\$1.62)	NM	NM	\$38	(\$35)	\$485	\$362	12.8
Infoseek Corp.	SEEK	\$10.19	-7.9%	31.5%	(\$0.93)	(\$0.74)	NM	NM	\$28	(\$24)	\$273	\$76	9.7
Lycos Inc.	LCOS	\$40.75	33.3%	256.3%	(\$0.27)	\$0.06	NM	509.4	\$28	(\$4)	\$562	\$404	20.1
Mindspring Enterprises Inc.	MSPG	\$32.88	12.6%	415.7	(\$0.94)	(\$0.54)	NM	NM	\$44	(\$7)	\$248	\$214	5.6
Netcom On-Line Comm. Serv. Inc.	NETC	\$22.50	13.2%	56.5%	(\$3.15)	(\$2.92)	NM	NM	\$157	(\$37)	\$264	\$97	1.7
PSInet Inc.	PSIX	\$5.50	-18.5%	-53.2%	(\$1.20)	(\$1.11)	NM	NM	\$110	(\$48)	\$222	(\$249)	2
Yahoo Inc.	YHOO	\$71.00	38.9%	483.6%	(\$0.45)	\$0.00	NM	NA	\$49	(\$19)	\$3,060	\$2,576	NA
WIRED COMMUNICATIONS NETWORKS													
Alltel Corp.	AT	\$41.38	4.1%	27.8%	\$2.62	\$2.14	15.8	18.6	\$3,221	\$495	\$7,668	\$1,530	2.4
Ameritech Corp.	AIT	\$83.13	7.9%	32.2%	\$4.11	\$4.23	20.2	18.2	\$15,735	\$2,256	\$45,473	\$10,942	2.9
AT&T Corp.	T	\$62.63	12.1%	43.1%	\$2.75	\$2.65	22.8	21.1	\$52,839	\$4,476	\$101,783	\$30,936	1.9
Bell Atlantic Corp.	BEL	\$91.00	2.0%	34.1%	\$2.74	\$4.84	33.2	18.4	NA	NA	\$70,674	\$40,961	NA
BellSouth Corp.	BLS	\$57.94	5.8%	31.7%	\$3.19	\$2.82	18.2	19.4	\$20,083	\$3,165	\$57,474	\$13,738	2.9
Cablevision Systems Inc.	CVC	\$93.88	14.6%	220.9%	(\$13.21)	(\$14.22)	NM	NM	\$1,675	(\$183)	\$2,341	\$1,614	1.4
Cox Communications Inc.	COX	\$39.50	16.4%	80.6%	(\$0.43)	(\$0.51)	NM	NM	\$1,574	(\$116)	\$10,686	\$4,774	6.8
Frontier Corp.	FRO	\$23.94	-2.3%	9.4%	\$0.48	\$0.99	49.9	24.7	\$2,341	\$79	\$3,929	\$349	1.7
GTE Corp.	GTE	\$51.25	1.4%	10.5%	\$3.00	\$2.92	17.1	17.3	\$22,664	\$2,876	\$49,014	\$4,415	2.2
MCI Communications Corp.	MCIC	\$43.38	-1.3%	31.9%	\$1.00	\$1.13	43.4	38.9	\$19,298	\$696	\$28,801	\$6,285	1.5
SBC Communications Inc.	SBC	\$74.00	1.9%	34.2%	\$1.87	\$3.50	39.6	20.8	\$22,040	\$1,429	\$67,828	\$34,551	3.1
Sprint Corp.	FON	\$57.88	-1.2%	43.8%	\$2.31	\$2.26	25.1	25.9	\$14,681	\$1,004	\$24,875	\$7,550	1.7
Tele-Communications Inc.	TCOMA	\$28.38	23.9%	118.3%	(\$1.15)	(\$0.57)	NM	NM	\$7,134	(\$737)	\$19,383	\$10,685	2.7
US West Inc.	USW	\$45.38	0.4%	35.4%	\$2.74	\$2.58	16.6	17.5	\$10,402	\$1,321	\$21,945	\$5,892	2.1
WorldCom Inc.	WCOM	\$31.00	-3.1%	24.6%	(\$4.97)	\$0.38	NM	84.2	\$6,583	(\$1,901)	\$28,122	\$17,963	4.3
WIRELESS COMMUNICATIONS NETWORKS													
Aerial Comm Inc.	AERL	\$7.25	-20.0%	-7.9%	(\$2.36)	(\$2.75)	NM	NM	\$26	(\$169)	\$518	(\$43)	20.1
AirTouch Comm. Inc.	ATI	\$41.25	5.1%	61.8%	\$0.62	\$0.69	66.5	56.9	\$3,374	\$364	\$20,811	\$8,031	6.2
EchoStar Comm. Corp.	DISH	\$17.00	-4.9%	-25.3%	(\$6.97)	(\$5.33)	NM	NM	\$336	(\$287)	\$704	(\$214)	2.1
Hughes Electronics Corp.	GMH	\$37.13	-44.4%	-34.9%	\$3.24	\$2.18	11.5	30.6	\$16,799	\$1,298	\$14,846	(\$7,948)	0.9
Mobile Telecomm. Tech. Corp.	MTEL	\$22.38	28.8%	161.3%	(\$2.98)	(\$1.98)	NM	NM	\$384	(\$149)	\$1,223	\$757	3.2
Nextel Communications Inc.	NXTL	\$25.38	0.5%	89.7%	(\$3.98)	(\$3.85)	NM	NM	\$560	(\$947)	\$6,554	\$3,537	11.7
Paging Network Inc.	PAGE	\$10.88	-9.8%	-29.3%	(\$1.47)	(\$1.48)	NM	NM	\$930	(\$150)	\$1,116	(\$461)	1.2
Qualcomm Inc.	QCOM	\$52.38	-22.7%	29.3%	\$1.27	\$2.15	41.2	31.5	\$2,096	\$92	\$3,568	\$873	1.7
Rogers Cawley Mobile Comm.	RCN	\$9.00	-21.7%	-54.4%	(\$0.13)	(\$0.06)	NM	191.7	\$867	(\$11)	NA	NA	NA
Telephone & Data Systems	TDS	\$46.50	5.8%	27.4%	\$0.59	\$0.22	78.8	199.7	\$1,407	\$38	\$2,768	\$539	2
360 Communications Co.	XO	\$19.63	1.9%	-16.5%	\$0.53	\$0.60	37	32.1	\$1,295	\$65	\$2,391	(\$356)	1.8
U.S. Cellular Corp.	USM	\$31.50	-3.8%	15.1%	\$1.13	\$1.16	27.9	28.2	\$832	\$98	\$2,716	\$359	3.3
U.S. Satellite Broadcast Inc.	USSB	\$7.94	-5.2%	-27.0%	(\$1.12)	(\$0.76)	NM	NM	\$420	(\$101)	\$713	(\$264)	1.7
Vanguard Cellular Sys. Inc.	VCELA	\$13.00	-6.7%	-18.8%	(\$0.06)	(\$0.05)	NM	NM	\$357	(\$2)	\$524	(\$138)	1.5
Vodafone Group Plc	VOD	\$72.75	10.2%	76.9%	\$2.07	\$2.17	35.1	30.4	NA	NA	NA	NA	NA
DISTRIBUTORS/INTEGRATORS AND DATA SERVICES													
Affiliated Comp. Serv. Inc.	AFA	\$26.31	12.6%	-8.5%	\$1.12	\$1.25	23.5	18.7	\$653	\$41	\$955	(\$62)	1.5
American Mgmt Sys. Inc.	AMSY	\$19.00	-18.5%	-25.9%	\$0.19	\$0.79	100	29.5	\$867	\$8	\$788	(\$258)	0.9
Anixter Intl. Inc.	AXE	\$17.00	-5.2%	5.4%	\$0.88	\$0.92	19.3	19.5	\$2,732	\$42	\$808	\$29	0.3
Arrow Electronics Inc.	ARW	\$32.44	5.9%	22.4%	\$1.58	\$2.06	20.5	14.9	\$7,286	\$159	\$3,187	\$460	0.4
Automatic Data Proc. Inc.	AUD	\$62.63	11.3%	42.7%	\$1.80	\$2.06	34.8	27.3	\$4,240	\$526	\$18,317	\$5,578	4.3
Avnet Inc.	AVT	\$65.50	-1.1%	12.2%	\$4.30	\$4.71	15.2	14.1	\$5,508	\$183	\$2,662	\$127	0.5
Cambridge Tech. Part. Inc.	CATP	\$41.50	6.8%	28.2%	\$0.56	\$0.62	74.1	62.7	\$320	\$31	\$2,086	\$594	6.5
Ceridian Corp.	CEN	\$46.19	5.3%	13.3%	\$0.63	\$2.50	73.3	17.6	\$1,634	\$48	\$3,594	\$794	2.2
CompUSA Inc.	CPU	\$29.63	-19.0%	48.1%	\$1.09	\$1.29	27.2	28.3	\$4,812	\$103	\$2,721	\$913	0.6
Computer Sciences Corp.	CSC	\$79.94	0.9%	-3.7%	\$3.11	\$3.38	25.7	23.4	\$6,024	\$244	\$6,207	(\$96)	1
DST Systems Inc.	DST	\$42.94	15.9%	34.2%	\$1.11	\$1.17	38.7	31.7	\$628	\$55	\$2,111	\$520	3.4
Electronic Data Sys. Corp.	EDS	\$43.63	14.8%	-1.4%	\$1.47	\$1.88	29.7	20.2	\$15,013	\$720	\$21,381	(\$134)	1.4
First Data Corp.	FDC	\$30.25	6.8%	-22.4%	\$1.14	\$1.50	26.5	18.9	\$5,189	\$526	\$13,144	(\$4,321)	2.5
Fiserv Inc.	FISV	\$50.13	3.4%	40.2%	\$1.60	\$1.69	31.3	28.7	\$915	\$83	\$2,628	\$1,011	2.9
HBO & Co.	HBOC	\$47.69	6.3%	72.2%	\$0.61	\$0.90	77.5	49.9	\$1,030	\$124	\$9,512	\$4,713	9.2
Paychex Inc.	PAYX	\$51.75	26.2%	59.6%	NA	\$0.87	NA	47.1	NA	NA	NA	NA	NA
Policy Management Sys. Corp.	PMS	\$69.00	6.8%	49.2%	\$2.38	\$2.73	29	23.7	\$649	\$43	\$1,261	\$420	1.9
Primark Corp.	PMK	\$40.63	19.9%	62.5%	\$0.71	\$1.08	57.2	31.4	\$826	\$20	\$1,058	\$381	1.3
Shared Medical Sys. Corp.	SMS	\$64.00	0.0%	30.6%	\$2.27	\$2.35	28.2	27.2	\$867	\$57	\$1,600	\$447	1.8
SPS Transaction Services Inc.	PAY	\$22.44	4.1%	50.8%	\$0.96	\$1.27	23.4	17	\$545	\$26	\$611	\$206	1.1
Total Systems Services Inc.	TSS	\$25.19	3.9%	-4.0%	\$0.36	\$0.36	70	67.4	\$351	\$46	\$3,257	(\$137)	9.3
Vanstar Corp.	VST	\$11.25	-18.2%	-50.5%	\$0.57	\$0.94	19.7	14.6	\$2,498	\$25	\$484	(\$437)	0.2

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Successful technology transactions: IPOs: Healthcare Recoveries, Inc., Peak International Ltd.; Follow-On Stock Offerings: Bell & Howell Company, GST Telecommunications, Inc., MRV Communications, Inc., Tech Data Corporation; Convertible Debt Offerings: Adaptec, Inc., M&A: Acquisitions of Northrop Grumman Corporation by Lockheed Martin Corporation, GM Hughes Defense and Texas Instruments Defense by Raytheon Company, BDM International, Inc. by TRW Inc., Computing Devices International by General Dynamics Corporation, Measurex Corporation by Honeywell, Inc., L3 Communications Corporation by an Investor Group, PHAMIS, Inc. by IDX Systems Corporation, Compression Labs, Inc. by VTEL

Corporation, AlliedSignal's Ocean Systems Division by L3 Communications Corporation.

Description: Bear Stearns' technology specialists, supported by the resources of a well-capitalized, full-service firm, have assisted technology companies in raising over \$14 billion since 1991 through initial public offerings, follow-on equity offerings and convertible and straight debt offerings. We have also provided strategic advice to technology companies in many of the industry's most important mergers, acquisitions and strategic partnerships. Our commitment to technology investment banking is evidenced by this breadth of services, the range of our clients and the repeat business which we are awarded.

Broadview Associates

Broadview Associates, LLC

One Bridge Plaza
Fort Lee, NJ 07024
(800) 346-9616

Contact: Paul Deninger

Additional office: Silicon Valley, London

Successful technology transactions:

Matrixx Marketing Inc (a sub of Cincinnati Bell)/American Transtech Inc (a sub of AT&T), Software Artistry/Tivoli (a sub of IBM), Axent/Raptor, RadNet/Siemens & Newbridge, DSC/Celcore, Peterchadwick/Cambridge Technology Partners, National Health Enhancement Systems, Inc./HBO&Company, UniData/VMark, DynaSoft/SecurityDynamics, Netcom Systems/Summit Partners, AT&T/HBO&Company, ESI/HBO&Company, PLATINUM technology, inc/Learnmonth & Burchett Management Systems Inc.

Description: Broadview Associates is a leading M&A investment bank serving the IT, communications and media industries. The firm focuses on advising companies on mergers and acquisitions, restructurings and financings. Through a global network of nearly 200 employees operating across the United States, Europe, Asia and Israel, Broadview assists clients in evaluating available strategic options, defining key business issues related to value and expertly executing transactions.

(See ad on pages 8, 9)

BT Alex. Brown

BT Alex. Brown

One South Street
Baltimore, MD 21202
(800) 638-2596

Contacts: Technology and New Media: R. William Burgess, Jr. - bill.burgess@btalexbrown.com; Michael Halloran - michael.halloran@btalexbrown.com; Robert K. Packard - bpackard@alexbrown.com

Additional offices: Boston, London, New York, San Francisco, Tokyo

Successful technology and media

Assignments: America Online, @Home, Amazon.com, BBN, Gemstar, Four11, Manugistics, Maxis, NETCOM, OnSale, Security Dynamics, Sterling Commerce, WorldGate, Zip2

Description: BT Alex. Brown provides a full-range of investment banking and advisory services to a select group of high quality emerging growth companies. We have particular expertise in Technology, Media & Communications, and Health Care. Intense focus plus breadth of transaction expertise yields value-added advice for our clients.

(See ad on page 26, 27)



The Catalyst Group

406 Farmington Avenue
Farmington, CT 06032
(860) 676-7794, Fax (860) 653-1956

Contact: John Worthen

Email: jworthen@catalyse.com

Additional offices:

Winchester, UK
+44 1962 840816, Fax +44 1962 840817

Contact: John Scholes

Email: jscholes@catalyse.com

Description: The Catalyst Group provides international corporate development solutions to the information technology industry. With operations in the US and Europe, we catalyze our clients' success, from advising on strategy creation and review, right through to implementing mergers and acquisitions, divestitures, financing, worldwide distribution and licensing, strategic alliances and joint ventures.



A CIBC WORLD MARKETS COMPANY

CIBC Oppenheimer Corp.

World Financial Center
200 Liberty St.
New York, NY 10281
(800) 667-OPCO, Fax: (212) 667-5851

2420 Sand Hill Road, Suite 300
Menlo Park, CA 94025
(888) 234-9001, Fax: (650) 234-2450

Contacts:

New York: Stanley Stern, Robert Buxton, Menlo Park: Joseph Dews, Eric Risley

Successful technology transactions:

3Dlabs, Aehr Test Systems, Alantec, ANADIGICS, Anaren Microwave, Celeritek, Digital Microwave, DSP Communications, DSP Group, Glenayre, OPAL, Peregrine Systems, RF Micro Devices, Sawtek, US Robotics, VertiCom, Vitesse Semiconductor and Zoran

Description: CIBC Oppenheimer is the US investment banking arm of CIBC World Markets and is a leading New York investment bank providing financial and advisory services to clients worldwide. CIBC World Markets, with 8000 employees in 31 cities in 14 countries, is the Global Investment Banking division of Canadian Imperial Bank of Commerce, the 7th largest bank in North America with assets of \$174.4 billion. CIBC Oppenheimer's success in investment banking has been built upon outstanding equity research and broad distribution capabilities. Combined with CIBC's capital markets activities including high yield finance, securitization and loan underwriting, CIBC Oppenheimer now provides our clients with a complete range of equity, convertible, fixed-income and credit market products with excellent research and distribution capabilities within a global infrastructure. Technology represents the largest portion of CIBC Oppenheimer's investment banking business.

CORUM

Corum Group, Ltd.

10500 N.E. 8th Street, Suite 1910
Bellevue, WA 98004
(425) 455-8281, Fax (425) 451-8951

Contact: Bruce Milne

Email: corum@corumgroup.com

Web site: www.corumgroup.com

Successful technology transactions:

GTIS/FormGen; BDM/RGTI; SPSS/CLEAR; IMNET/Hunter; JetForm/Proactive; SHL/SECA; Manugistics/AVYX; ForeFront Group/AllMicro; Mathsoft/StatSci; Reuters/EQUIS; Adaptec/Incat; CFI/Culverin; Symantec/DMA;

OmTool/cma-ettworth,
SunGard/BancWare, Kewill/Exeter,
Microsoft/Sabaki, Compuware/MicroQuill,
Intel/Syncro

Description: Corum is the leading seller of software companies in the world. Our professional staff, all with senior industry, CEO-level experience, draws upon Corum's vast database of almost 45,000 software companies and utilizes an exhaustive team-based process to achieve the highest valuations for our clients. Corum also sponsors the popular international Selling Up Selling Out conference series.



Cowen & Company

Financial Square
New York, NY 10005-3597
(212) 495-6000 or (800) 221-5616

Contacts: Terrence R. Connelly, Managing Director/Head of Investment Banking; Richard Char, Managing Director, Co-Head of Technology Investment Banking; Jeff Harmon, Managing Director, Co-Head of Technology Investment Banking; Chris Kirby, Managing Director, International Technology Investment Banking (London); Robert D. Valdez, Managing Director/Head of Financial Advisory Services; Maria Lewis Kussmaul, Managing Director; Adele Morrisette, Managing Director; Jerry B. Newman, Managing Director; Richard L. Rugani, Managing Director;

Web site: www.cowen.com

Additional offices:

Cowen & Company
One Angel Court
London, England EC2R, 7HJ
011-44171-710-0900

Cowen & Company
Four Embarcadero Center, Suite 1200
San Francisco, CA 94111
(415) 646-7200

Cowen & Company
Two International Place
Boston, MA 02110
(617) 946-3700

Successful transactions: America Online, \$350m, Convertible Debt; Applied Graphics Technologies, \$296m, FO (Lead); Aurum Software, \$313m, Sale to The Baan Company; Control Data Systems, Inc., \$283m, Sale to Welsh, Carson, Anderson & Stowe; Lernout & Hauspie, \$5m, \$14m, \$108m, Acquisition of Centigram text-to-speech division, acquisition of GMS GmbH, FO (Lead); Qlogic, \$83m, FO (Lead); SCM Microsystems, \$50m, IPO (Lead); Sequent Computer, \$200m, FO; The Indus Group, \$281m, Acquisition of TSW International; Veritas Software Corporation, \$249m, Merger with OpenVision Technologies, Inc.

Description: Cowen & Company is a securities and investment banking partnership with a history of leadership in covering the industries of the 21st century—technology, health care, communications and media/entertainment. Cowen provides comprehensive investment banking services to international companies within these sectors, including equity financing, private placements, mergers & acquisitions and ongoing strategic counsel.

(See ad on pages 18, 19)

CRUTTENDEN ROTH

financing for a better future

Cruttenden Roth Incorporated

18301 Von Karman, Suite 100
Irvine, CA 92612
(714) 757-5700

Contacts:

Irvine: (714) 757-5700, Byron Roth, Joseph Sherwood, Lisa Walters-Hoffert
Los Angeles: (310) 235-2188, Michael Doherty, Christopher Jennings
San Francisco: (415) 782-5000, Charles Thompson
Denver: (303) 595-3377, Richard Stebbins
Seattle: (206) 587-2484, Jim Stearns

Successful technology transactions:

IPOs: SRS Labs, SEEC, Overland Data, AlphaNet Solutions, Percon, Eltron International, Netspeak, ATL Products, Brilliant Digital Entertainment, Laser Power Corp., InterVU Inc.

Follow-On offerings: Tekelec, Data Dimensions, UniComp, Eco Soil Systems

Description: Cruttenden Roth is a full-service investment bank focused on aiding emerging growth companies. Since 1994, we have raised over \$1.5 billion in public equity for our clients. Cruttenden Roth has been ranked in the top twenty in aftermarket performance (among all investment banks in the country) of all lead-managed IPO's for the last four years. The firm offers specialized research coverage in telecommunications, semiconductors, peripherals, software, computer systems and subsystems.

Deutsche Morgan Grenfell

Technology Group

DMG Technology Group

DMG Technology Group
1550 El Camino Real, Suite 100
Menlo Park, CA 94025
(650) 614 5000, Fax: (650) 614 5030

Contact: Tony Trouset

Additional offices:

San Francisco (415) 217 4200
Boston: (617) 210 7510
London: (44) 171 545 1100

Successful technology transactions:

Amazon.com — \$54MM Lead-managed IPO and \$75MM Senior Secured Credit Facility
Ascend Communications — \$3.7BN merger with Cascade; Corsair Communications — \$43MM Lead-managed IPO; Beta Systems — \$64MM Lead-managed IPO; Cypress Semiconductor — \$175MM Lead-managed Convertible Offering; Diamond Lane Communications — \$31MM Sole-managed Private Placement; Lucent Technologies — \$1.8BN acquisition of Octel, and \$300MM sale of Advanced Technology Systems business to General Dynamics; National Semiconductor — \$570MM acquisition of Cyrix, \$550MM sale of Fairchild Semiconductor to Citicorp Venture Capital; PureAtria — merger with Rational Software; VeriFone — \$1.18BN merger with Hewlett-Packard

Description: DMG Technology Group is the investment bank of choice for established and emerging technology leaders who want to change the landscape of their industry through creative financings, innovative research, and high-impact M&A advice. DMG Technology Group uniquely combines the industry expertise, entrepreneurial spirit, and Silicon Valley presence of a focused boutique with the global reach, substantial capital and global reach of one of the world's largest banks. Deutsche Morgan Grenfell is the investment banking arm of Deutsche Bank Group.

(See ads on pages 4, 5, 63, 65, 67, 69, 71, 80, 81)

F.A.C./Equities

A division of First Albany Corporation

FAC/Equities

A division of First Albany Corporation

53 State Street
Boston, MA 02109

Contact:

Giles McNamee (617) 228-3500,
Fax (617) 228-3513
Andy Axel (650) 425-2477

Web site: www.fac-equities.com

Successful technology transactions:

Made2Manage Systems, U.S. Web, Information Advantage, Cognicase, Pervasive Software, Omtool, Natural MicroSystems, 4Front Technologies

Description: FAC/Equities' Investment Banking Group provides full service investment banking to technology companies in emerging industries. As one of the leading institutionally-oriented, research-driven investment firms, we emphasize the quality of our aftermarket support and our long-term client relationships.

(See ad on page 125)

FROST & BERMAN
INCORPORATED**Frost & Berman, Inc.**

44 Montgomery, 22nd Floor
San Francisco, CA 94104
(415) 274-2400, Fax (415) 274-2444

Contacts: Ian Berman (Managing Director),
Dean Frost (Managing Director), Brian
Feldman (Director), Ned Elliott (Director)

Email: mail@frostberman.com

Additional office: Frost & Berman Europe
Hamish Stewart, Managing Director,
Europe, +44-171-251-5525

Successful technology transactions: Frost & Berman represents publishers, media, and technology companies participating in the digital content industry. Successful M&A transactions include: 3DO/New World, Allegro/Software Publishing Corp., The Learning Company/SMC, Graphix Zone/Sony ImageSoft, T*HQ/Heliotrope, Allegro/Serif, Gremlin/Imagitec, Acclaim/Sculptured, Electronic Arts/Manley, Gremlin/DMA Design, Byron Preiss/Onramp Productions, Gremlin/Dream Weaver, Byron Preiss/Orange Cherry, Byron Preiss/HighText Interactive. Successful placements include: Velocity, AbleSoft, Software Marketing Corp., and Vertigo.

Description: Frost & Berman is the leading merger, acquisition, and financial advisory firm exclusively focused on digital content. Founded in 1991, the firm's resources are directed to assist publishers, media, and technology companies in the business-to-business software and the consumer (primarily education and entertainment) software sectors.

**Gerard Klauer Mattison & Co., Inc.**

529 Fifth Avenue
New York, NY 10017
(212) 885-4000, Fax (212) 338-8991

Contact: Eric Singer, esinger@gkm.com

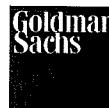
Web site: www.gkm.com

Additional offices: Boston (617) 451-0670,
Chicago (312) 697-7170

Successful technology transactions: Pretty Good Privacy, Cylink, C-C Group, Optimal Robotics, Gad Line, American Communications Services, Tel-Save Holdings, Jabil Circuit, Elamex, Metrologic Instruments

Description: Founded in 1989, Gerard Klauer Mattison & Co., Inc. is a full-service

investment bank focused on providing services to corporations in industries where we have demonstrated research expertise. In particular, we have a strong technology team which covers the Personal Computers /Enterprise Hardware, Internet/Electronic Commerce, Telecommunications Services & Equipment, Data Networking, Wireless Cable and Interactive Entertainment Software segments. To date, we have managed over \$3.1 billion in public offerings and private placements and have advised over \$1.6 billion in transactions, including mergers and acquisitions, bankruptcies and leveraged buyouts.

**Goldman, Sachs & Co.**

555 California Street, 45th Floor
San Francisco, CA 94104
(415) 393-7760

Contact: Brad Koenig

Email: brad.koenig@gs.com

Additional offices: New York:

Lawrence Calcano, (212) 902-1725 or
lawrence.calcano@gs.com; Tokyo: Michiya Nagai, 011-813-5573-7933; London: Fergal O'Driscoll, 011-44-171-774-4215; Hong Kong: Tim Dattels, 011-852-2978-1833

Successful technology transactions

includes: Financings for America Online, BEA Systems, Check Point Software Technologies, CIENA, CUC International, DSC Communications, Genesys Telecommunications Laboratories, LHS, Micron Technology and Taiwan Semiconductor Manufacturing Company. Financial advisories for 3Com, Cadence Design Systems, i2 Technologies, Lucent and Yahoo!

Description: Goldman Sachs' mission is to be the leading financial advisor to the highest-quality technology companies, both large and small. We emphasize a long-term commitment to our clients, the highest standard of technology equity research coverage and the widest range of investment banking services to address our clients' needs.

(See ad on pages 13, 14, 15)

JPMorgan**J.P. Morgan & Co.****Technology Group**

101 California Street, 38th Floor
San Francisco, CA 94111
(415) 954-3200

60 Wall Street
New York, NY 10260
(212) 648-8100

Contacts:

SF: David Courtney, (415) 954-4779
NY: Joe Walker, (212) 648-7595

Web site:

<http://www.jpmorgan.com/techgroup>

Additional offices: New York, Chicago, and throughout U.S., Europe, Asia, and Latin America

Research analysts: Bill D. Rabin - Networking; Rai Archibald - Internet commerce and Information services; Lou Gutentag - Enterprise software; Terry Ragsdale - Semiconductors; Daniel Kunstler - Computer systems; Greg Geiling - Telecom equipment

Selected successful technology

transactions: *Equity financings* - Inacom (follow-on, convertible); Network Solutions (IPO); Galileo International (IPO); Cap Gemini SA (block trade); Peapod (IPO); PSW Technologies (IPO); CIBER (follow-on); Cirrus Logic (144A Convertible); Eidos Plc (ADR); Award Software (IPO); Trusted Information Systems (IPO); EDS (follow-on); Claremont Technology (IPO); Dassault Systèmes (IPO, follow-on); Iomega (follow-on); DecisionOne (IPO); Engineering Animation (IPO, follow-on); RadiSys (IPO); National Semiconductor (144A Convertible); Cambridge Technology Partners (follow-on)

M&A assignments: Dassault Systèmes' acquisitions of Deneb Robotics (\$105 million) and SolidWorks (\$310 million); Datacraft's sale to Dimension Data Australia Pty. (\$238 million); Welsh, Carson, Anderson & Stowe's acquisition of Control Data Systems (\$280 million); Galileo International Partnership's acquisition of Apollo Travel Services (\$700 million); Packard Bell Electronics' merger with NEC's personal computer and server business (\$300 million); Sun Microsystems' acquisition of Integrated Micro Products Plc (\$96 million); TRECOM Business Systems' sale to Amdahl Corporation (\$145 million)

Description: J.P. Morgan's Technology Group provides a full range of equity underwriting, M&A, and principal investing services to high-growth companies. A team of dedicated technology specialists in San Francisco, New York, London, and other worldwide offices provides clients with the industry focus of a boutique and draws on the firm's global resources.

**L.H.F L.H. FRIEND, WEINRESS,
W&P FRANKSON & PRESSON, INC.**
INVESTMENT BANKERS

3333 Michelson Drive, Suite 650
Irvine, CA 92612
(714) 852-9911, Fax (714) 852-0430

Contact: Gregory E. Presson, President & Sr. Managing Director-Corporate Finance

Successful technology transactions:

Pro-Log, Inc. (M&A), Action Instruments (M&A), Triton Systems, Inc. (Private Placement), Future Domain Corporation (M&A), Kinetic Systems, Inc. (Private Placement), U.S. Order, Inc. (IPO), Vertec, Inc. (Private Placement), High Technology Resources, Inc. (Private Placement), Birtcher Medical Systems, Inc. (M&A), Comteco, Inc. (Private Placement), Ballantyne of Omaha, Inc. (Follow-On Offering)

Description: Serves middle-market growth companies in the high-technology, healthcare, specialty retail, telecommunications and basic industrial manufacturing industries and provides unique discovery research to both domestic and international institutional investors.

LEHMAN BROTHERS

Lehman Brothers Inc.

555 California Street
San Francisco California 94104
(415) 274-5200, Fax (415) 274-5381

Contacts: Mike Wishart, Stu Francis

Web site: www.lehman.com

Additional Offices and Contacts:

New York, Jack Skydel (212) 526-3114
New York, Andrew Malik (212) 526-0112
New York, John MacDonald (212) 526-4632
San Francisco, Mark Dicioccio (415) 274-5260
London, Gerald Coughlan 44-171-260-2246
Tel Aviv, Ron Lubash 972-3-696-6122
Tokyo, Mas Nakamura 8135-571-7061
Taipei, Jaw-Sheng Kong 886-2-545-7900

Successful Technology Transactions:

M&A: Tandem/Compaq (8/97), Zilog/Texas Pacific (pending), Digital Equipment/Cabletron (pending), Fujitsu/Amdahl (9/97), Diba/Sun (8/97), Quinta/Seagate (8/97), Amphenol/KKR (5/97)

IPOs: Gilat Communications (12/97), Hypercom (11/97), Electric Lightwave (11/97), Galileo International (7/97), Metrika (7/97), Schick Technologies (7/97)

Follow-on Equity Offerings: SpeedFam (10/97 & 2/97), Advanced Energy (10/97), Spectrian (8/97), NICE-Systems (7/97), Pricer (7/97), ASE Test (6/97)

Convertible Securities Offerings: AOL (11/97), Tecnomatix (7/97), Telular (6/97), Gilat Satellite (5/97), QUALCOMM (3/97)

Description: Lehman Brothers' Global Technology Group has six offices worldwide with over 50 bankers and 17 research

analysts. The Global Technology Group provides financing and advisory services to companies at all stages of development, from private equity for emerging growth companies to investment-grade debt for established market leaders as well as merger and acquisition advisory services to clients of all sizes. Lehman Brothers' Global Technology Group provides global, full service, relationship banking with the unique ability to engage in the lifecycle needs of our clients.

(See ad on page 73)



Merrill Lynch

Merrill Lynch Investment Banking/Global Technology Group

3300 Hillview Avenue, Suite 150
Palo Alto, CA 94304
(650) 849-2100, Fax: (650) 849-2101

Contact: Paul Sciacibica

Email: paul_sciacibica@ml.com

Additional offices:

Merrill Lynch
World Financial Center
North Tower
New York, NY 10281

Successful technology transactions:

@Home, Hewlett Packard, Boston Technology, PsiNet, Lexmark, Motorola, Paracent, Kent Electronics, Brooks Automation, General Cable, General Instrument, Cisco/Dagaz Technology, Teleinfo SA, Verio, Candescent, China Internet

Description: Merrill Lynch is one of the world's leading financial management and advisory companies with offices in more than 40 countries and total private client assets exceeding \$1 trillion. As an investment bank, it is the top global underwriter and market maker of debt and equity securities and a leading strategic advisor to corporations, governments, institutions, and individuals worldwide. The Global Technology banking practice has over 50 dedicated bankers who provide advisory, M&A and underwriting expertise to all sectors of the information technology marketplace.

(See ad on pages 36, 37)

**MORGAN STANLEY
TECHNOLOGY GROUP**

Morgan Stanley

Dean Witter

3000 Sand Hill Road
Bldg. 4, Suite 250
Menlo Park, CA 94025
(650) 233-2500

Contacts: Rex Golding, Menlo Park (650-233-2552); Jim Liang, New York (212-761-7296); Dhiren Shah, London (011-44-171-425-5166); Chuck Cory, Menlo Park (650-233-2627)

Additional offices: Boston, Hong Kong, San Francisco, Tokyo

Successful technology transactions:

Livingston Enterprises' \$650MM acquisition by Lucent Technologies, McAfee Associates' \$1.1Bn merger with Network General, Tandem Computers' \$2.7Bn acquisition by Compaq Computer, Cascade Communications' \$2.9Bn merger with Ascend Communications, Hewlett-Packard's \$1.2Bn acquisition of VeriFone, US Robotics' \$8.9Bn merger with 3Com, Excel Switching's \$109MM IPO, MMC Networks' \$45MM IPO, JD Edwards' \$418MM IPO, IBM's \$1Bn debt offering, Silicon Graphics' \$233MM convertible offering, @Home Network's \$108MM IPO.

Description: Morgan Stanley's Technology Group has been serving the needs of leading technology companies worldwide for the past 18 years. Morgan Stanley combines its global presence with thorough technology industry knowledge to provide world-class financial services tailored specifically to the technology industry. Morgan Stanley is committed to building lasting relationships with the world's highest quality technology companies—from today's established leaders to tomorrow's emerging stars.

(See ad on pages 30, 31)

NationsBanc Montgomery Securities

NationsBanc Montgomery Securities LLC

NationsBank

NationsBanc Montgomery Securities LLC

600 Montgomery Street
San Francisco, CA 94111
(415) 627-2000

Contact: J. Sanford Miller, Director of Technology Investment Banking

Web site:

<http://www.nationsbancmontgomery.com>

Additional offices:

Two International Place
Boston, MA 02110

100 North Tryon Street
Charlotte, NC 28255

901 Main Street
Dallas, TX 75202

9 West 57th Street
New York, New York 10019

Successful 1997 technology transactions:
RF Micro Devices: lead managed \$41.9 mm IPO; Peritus Software Services; lead managed \$64.4 mm IPO; Apex PC Solutions: lead managed \$36.2 mm IPO and \$119.6 mm follow-on offering; ONSALE, Inc.: lead managed \$17.3 mm IPO and \$65 mm follow-on offering; Micron Technology, Inc.: co-managed \$500 mm convertible offering; CHS Electronics, Inc.: co-managed \$474.7 mm follow-on offering; E*TRADE Group, Inc.: co-managed \$256.2 mm follow-on offering; Raptor Systems, Inc.: sole advisor in their \$250 mm merger with AXENT Technologies, Inc.; The Registry, Inc.: sole advisor in their \$430 mm merger with Renaissance Solutions, Inc.; Investor Group: purchase of Netcom Systems, Inc.; CitySearch: sole managed 2 private placements totaling \$33 mm.

Description: NationsBanc Montgomery Securities LLC [NMS], a subsidiary of NationsBank Corporation, is a full-service investment bank and brokerage firm with approximately \$800 million of regulatory capital. The company provides research, trading and issuance in the equity and fixed-income markets (high yield, emerging markets, high grade and mortgage-backed markets). Other services include M&A advisory, financial buyer coverage, loan syndications, global investment banking, real estate finance, mortgage finance, money markets and the primary dealer. Through NationsBank, NMS clients can also access products and services that include senior bank debt, bridge financing, real estate banking, treasury management, trade finance and risk management (derivatives products and foreign exchange).

In 1997 we raised over \$15 billion for our technology clients. We ranked as the leading investment banking firm for technology equity transactions in both number of deals and total dollars raised. We also maintain a significant presence in technology M&A, ranking 3rd as an advisor for technology M&A in 1997. We advised on 29 transactions that accounted for over \$2.3 billion in value.

NMS is a registered broker-dealer with the Securities and Exchange Commission and is a member of the National Association of Securities Dealers and the New York Stock Exchange. NMS employs more than 2,200 investment professionals.

Needham

Needham & Company, Inc.

445 Park Avenue, 3rd Floor
New York, NY 10022
(212) 371-8300, Fax: (212) 751-1450

Contacts: John J. Prior, Jr., Managing Director and Chad W. Keck, Managing Director - Menlo Park, CA

Email: jprior@needhamco.com and ckeck@needhamco.com

Additional offices: Boston, MA: Margaret S.C. Johns, (617) 457-0910; Menlo Park, CA: Chad W. Keck, (650) 854-9111 x. 12

Successful technology transactions: ADE Corporation (Follow-On), ANADIGICS, Inc. (Follow-On), Brooks Automation, Inc. (Follow-On), Computer Products, Inc. / Zytec Corporation (M&A), Creative Technologies, Ltd. / ENSONIQ Corporation (M&A), Emcore Corporation (IPO), Hadco Corporation / Zycon Corporation (M&A), LeCroy Corporation (Follow-On), Remec, Inc. (Follow-On), Sanmina Corporation / Elexsys International, Inc. (M&A) and SpeedFam International, Inc. (2 Follow-On Offerings)

Description: Needham & Company, Inc. provides investment banking services to emerging growth companies and to institutional investors in these companies. The firm focuses its efforts on companies in the technology, healthcare and consumer/retail industry sectors. During the past three years, Needham & Company, Inc. managed 126 equity and equity-linked offerings raising approximately \$5.8 billion and executed over \$3 billion in advisory transactions. Needham & Company, Inc. is also affiliated with Needham Capital Partners, L.P. and Needham Capital Partners II, L.P. which are investment partnerships that are long-term investors in the equity securities of private "mezzanine" stage companies. The firm is also affiliated with the Needham Growth Fund (Nasdaq Symbol - "NEEGX"), an SEC registered mutual fund.

NewCap Partners

5777 West Century Blvd., Suite 1135
Los Angeles, CA 90045
(310) 645-7900, Fax (310) 215-1025

Contacts: Thomas W. Turney, William F. Pinney, Val Giannini, David Kuo, Ken Epstein, Patrick Finnerty, Cathy Yang
Email: info@newcap.com

Additional offices: Orange County, Northern California, Beijing

Description: NewCap Partners is a private investment banking firm specializing in mergers and acquisitions as well as financings. Merger and acquisition activities include both sell-side and buy-side transactions and are supported by proprietary database systems and information tools.

NewCap Partners obtains debt and equity financing for its clients, including subordinated debt, mezzanine equity, and corporate equity investment with strategic partners. Projects include growth financings, buyouts and recapitalizations.

PaineWebber

PaineWebber, Inc.

555 California Street, 32nd Floor
San Francisco, CA 94104
(415) 576-2900, Fax (415) 398-6598

Contact: David Dicioccio

Email: pwtech@painewebber.com

Additional office: New York

13 Financing and 5 M&A transactions in 1997, including: Sale of Advanced Logic Research to Gateway 2000 and Compression Labs to VTEL, financings for P-Com, N2K, Network Solutions, Inacom, Advanced Energy, Iterated Systems, and Starfish Software.

Description: PaineWebber is a full-service investment banking and brokerage firm committed to providing financial advisory and underwriting services to high-quality technology companies. PaineWebber's capabilities include a top-ranked technology research team, powerful global institutional distribution and a retail network with more than \$289 billion under management. PaineWebber is a significant market maker in more than 150 technology stocks.

Piper Jaffray

Piper Jaffray Inc.

222 South Ninth Street
Minneapolis, MN 55402
(800) 333-6000

Additional office:

Piper Jaffray Inc.
1200 Fifth Avenue, Suite 1400
Seattle, WA 98101
(800) 677-4737

Piper Jaffray Inc.
2500 Sand Hill Road
Menlo Park, CA
(415) 233-2200

Contacts: Software Technology: John Jacobs, (206) 287-8831; William Patterson, (612) 342-6328; Kent Adams, (612) 342-6304; Kyle Crowe, (612) 342-6391; Mitch Stevko, (415) 233-2282; Chad Abraham, (415) 233-2263; Bill Benjamin, (612) 342-6342; James Lim (415) 233-2280; Chuck Ashley, (415) 233-2259; Peter Christothoulou, (206) 287-8847; Cameron Hewes, (206) 287-8837.

Web site: <http://www.piperjaffray.com>

Successful technology transactions:

Activision, Advantage Learning Systems, ARIS Corporation, Berkeley Systems, Computer Learning Centers, Computer Motion, D-Vision, Great Plains Software, Information Advantage, JDA Software, Knowledge Adventure, Learning Tree International, Mastering Inc., Quadramed, Splash Technology, Template Software

Description: Piper Jaffray Inc. is a leading investment banking firm. The technology group at Piper Jaffray focuses on growth companies in growth sectors including Convergence Applications, Computer Graphics Imaging, Education, Training & IT Services and Electronic Commerce, providing a full range of client services including corporate finance, research and trading. Since 1995, the firm has managed or co-managed 124 equity offerings with an aggregate value of over \$7.5 billion.

(See ad on page 103)



Prudential Securities

4 Embarcadero Center, Suite 3720
San Francisco, CA 94111
(415) 395-2600, Fax (415) 395-2606

Contacts: Jonathan Morgan, Michael Krasko, Ed Smith, Michael Jones, Paul Martin, Henry Alfaro and William Seery

Email:

Jonathan_Morgan@ccmail.prusec.com

Additional offices: One New York Plaza, NY, NY 10292

Selected technology transactions: Award Software, Brooktrout Technology, BTG, Cable Design Technologies, Cypress Semiconductor, DH Technology, GeoSystems Global Corporation, InVision Technologies, IPEC, JetFax, LeCroy, Lightbridge, Mail-Well, Mercury Computer Systems (pending), Microchip Technology, NovAtel, P-COM, Peerless Systems, Premiere Technologies (pending), QLogic, Quintar, Raster Graphics, Syntel, Trident International, Vitesse, Xeikon, XeTel, Xpedite Systems and World Access.

Description: Prudential Securities is a full-service investment banking and brokerage firm, with top-ranked global institutional and retail distribution capabilities, focused on the strategic financial needs of growth companies located both in the United States and abroad. The firm specializes in seven industry areas and technology is a major area of focus. Within technology we have further subdivided our coverage into four areas: i) electronic imaging; ii) networking and communications; iii) semiconductors; and iv) software. Other industry coverage includes: consumer, energy, financial services, health care, real estate, and telecom and media.

Punk, Ziegel & Company

520 Madison Avenue
New York, NY 10022
(212) 308-9494, Fax (212) 308-2203

Contacts: Julia Gregory, Roberta Hurst, Charles Schultz, Joshua Braunfeld

Web site: www.pzk.com

Successful technology transactions: PRT Group, Lynx Therapeutics, Computer Horizons, XcelleNet, Hummingbird Communications, IMNET Systems, Interlink Computer Sciences, Larscom, Legato Systems, Medic Computer Systems, Meridian Data, Network General, Objective Systems Integrators, Open Text Corporation, PSINet, SoftQuad International, Sunquest Information Systems, Westell Technologies

Description: Punk, Ziegel & Company provides a full range of research, market making and corporate finance services to institutional investors and emerging-growth companies. Resources are devoted to generating high-quality investment analysis on a focused group of high-growth industries including Enterprise Computing, Information Technology Services and Tools, Health Care Information Systems and Life Sciences. This specialized focus supports the outstanding investment and corporate finance advice crucial to success in today's emerging growth arena.

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A Member of *TravelersGroup*

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San Francisco, CA 94104
(415) 955-1552, Fax (415) 955-4976

388 Greenwich Street
New York, NY 10013
(212) 816-6000, (212)-816-4942

Migdal Yahalom
3/A Jabotinsky Street
Ramat Gan, 52520
Israel
011-972-3-613-7850, Fax 011-972-3-613-7851

Contacts: Joel Maryles (Group Co-Head), Barry Newman (Group Co-Head), Douglas Brengel, Craig Johnson, Brian Keane, Richard Northrop, John Sayres, Jerome Cincotta, Arin Goldman, Robert Messih, Emilio Sotil, Kevin Tice, Michael Tunstall, Chris Varelas, Scott Ades, Geoffrey Baldwin, Daniela Ballard, Mark Barber, Ben Druskin, Richard Gallivan, Nicholas Golding, Alexander Kay, James McVeigh, Keith Maillard, Michael Mitgang, Debra Weiss

Selected Lead Managed Technology

Financing Transactions: PRT (IPO), EFTC (secondary), SPR (IPO), Elbit Systems (sec-

ondary), Kent Electronics (convert), The DII Group (high yield), Box Hill Systems Corporation (IPO), Credence Systems Corporation (convert), HMT Technology (equity, convert), Technomatix (convert), QAD (IPO), Quantum (convert), Qwest Communications (IPO, high yield), IBM (debt)

Selected Technology M&A Transactions:

Kollmorgen/Pacific Scientific (pending), Storage Dimensions/Artecon (pending), WorldCom/CompuServe (pending), Comverse/Boston Technologies (pending), EDS/Neodata (pending), Misys Corporation/Medic Computer Systems, Eaton/Fusion Systems, Samsung/AST Research, DLJ Merchant Banking/DecisionOne, Lam Research/OnTrak Systems, Gemstar International/StarSight Telecast, Northern Telecom/The Williams Companies

Description: Salomon Smith Barney ranks among the world's foremost investment banking firms with a truly global reach. Salomon Smith Barney technology clients range from small, emerging growth companies to large, established companies. We believe that we are one of only a few firms that can provide technology companies with a comprehensive range of investment banking services including private placements, IPOs, convertibles, follow-ons, investment grade and high yield debt, share repurchase programs, underwritten calls, mergers and acquisitions and private wealth management.

SEQUOIA PARTNERS

Sequoia Partners, Inc.

1615 Bonanza Street, Suite 203
Walnut Creek, CA 94596
(510) 947-6699, Fax (510) 947-0850

Contact: Rick Borenstein

Email: RickB@sequoia1.com

Successful technology transactions:

Spectrum Associates/Goldman Sachs, Altai/Platinum Technology, Meridian Data/Parallan Computer, World Banking Systems/NYNEX, HNC/MITEX, Structured Solutions/EDS, Price Waterhouse/Cogent Systems, KnowledgeWare/Matesys, MINX Software/Spectrum Associates, Airsoft/Shiva, Computer Resources Group/PGA, Hotel Information Systems/MAI, Axis Consulting/Whittman Hart, Western Pacific Data Systems/Bowthorpe, PLC., Incentive Dimensions/Carlson Marketing, Workgroup Management/Documentum

Description: Sequoia Partners provides a combination of M&A services and strategic consulting, yielding premium M&A transactions. We strictly limit the number of clients we represent, focusing on the quality of results for each client, rather than on

volume of deals. We are entirely dedicated to the computer technology and services sector.

SoundView Financial Group, Inc.



22 Gatehouse Road
Stamford, CT 06911
(203) 462-7200, Fax (203) 462-7350
Contacts: Brian Bristol, Paul Mejean, Michael Zigman

One Embarcadero Center, Suite 3900
San Francisco, CA 94111
(415) 217-5500, Fax (415) 217-5501

Contact: Jonathan Meyers

Web site: www.sndvfncl.com

Successful technology transactions:

AccelGraphics (\$27MM IPO), BEA Systems (\$32MM IPO, \$117MM Follow-on), ILOG (\$28MM IPO), Industri-Matematik (\$163MM Follow-on), Information Management Associates (\$51MM IPO), Integrated Measurement Systems (\$34MM Follow-on), Integrated Silicon Solution (acquisition of Nexcom Technologies), IONA Technologies (\$158MM IPO), Pericom Semiconductor (\$23MM lead managed IPO), Sequent Computer Systems (\$184MM Follow-on), Simulation Sciences (\$56MM Follow-on), TSI International Software (\$41MM IPO), Vecco Instruments (\$12.6MM acquisition of Wyko Corporation), VIASOFT (\$88MM Follow-on).

Description: SoundView Financial Group, Inc. is the only full-service investment banking firm which focuses exclusively on the information technology sector: computer systems and software; design automation and intellectual property; networking systems and software; semiconductor devices and capital equipment; software development tools; telecommunications equipment and services; and wireless equipment and services. In addition to our eighteen senior equity research analysts, our firm has a long-term relationship with the Gartner Group (including Dataquest) providing exclusive sharing of research generated by their hundreds of analysts worldwide. Our investment banking clients enjoy superior access to serious technology investors when seeking equity in the public and private markets. The firm also provides merger and acquisition/financial advisory services to technology-oriented companies.

UBS Securities LLC

555 California Street, 46th Floor
San Francisco, CA 94104
(415) 352-5500, Fax (415) 352-5510

Contact: James Feuille

Email: jim.feuille@ubs.com

Additional contacts: San Francisco: Mike Dorsey (415) 352-5520; New York: Tim Walsh (212) 821-5225

Successful technology transactions:

Activision, Baan, Cisco, Concentric Networks, Innova, Intuit, i2 Technologies, Midway Games, New Era of Networks, Oracle, Peregrine Systems, Proxim, Scopus, Sipex, 3Dfx Interactive, 3D Labs, Veritas

Description: The UBS Technology Group provides the focused and integrated approach of technology specialty firms combined with the global resources and the capital strength of Union Bank of Switzerland. UBS is a leading financial services organization worldwide. In 1997 it was named "Best Foreign Securities Firm" in the U.S. by *Euromoney*. UBS Securities LLC is a wholly owned subsidiary of Union Bank of Switzerland.

(See ad on pages 118, 119)

UPDATA CAPITAL

The New Standard in IT M&A Performance

Updata Capital, Inc.

960 Holmdel Road
Holmdel, NJ 07733
(732) 946-2000, Fax (732) 946-0519

Contacts: Barry Goldsmith, Ira Cohen

Email: barry@updatagroup.com

Web site: www.updatacapital.com

Additional office:

11495 Sunset Hills Road
Reston, VA 20190
(703) 736-0020, Fax (703) 736-0022

Contacts: David Wetmore, John Burton

Recent Representative Transactions:

The Hunter Group, Inc./Renaissance Worldwide Inc. (formerly *The Registry, Inc.*); *Synergy Software, Inc./Complete Business Solutions, Inc.*; *The Constell Group, Inc./CIBER, Inc./Globalsoft Incorporated* (a subsidiary of *Schlumberger Incorporated*); *Mortice Kern Systems, Inc.* (MKS); *Haystack Laboratories, Inc./Trusted Information Systems, Inc.* (TIS); *Meridian Technology Marketing, Inc./Omnicom Group*; *Sirius Systems, Inc./Software Artistry, Inc.*; *Global Advanced Technology Corp./BARA, Inc.*

Note: Updata Capital represented the italicized companies.

Description: Updata Capital is one of the leading investment banking firms for the information technology industry. Since inception in 1987, Updata has managed

nearly \$5 billion in IT mergers and acquisitions, comprising 150 transactions. Updata provides every client with the highest level of personal attention and service in the industry. Each of Updata's Managing Directors has held senior executive positions in large, successful IT companies, and made them that way through successful mergers and acquisitions. No other firm can bring this depth of experience and expertise to the negotiation table. Updata Capital sets The New Standard in IT M&A Performance.

Wessels, Arnold & Henderson

Wessels, Arnold & Henderson

601 Second Avenue South
Minneapolis, MN 55402-4314
(612) 373-6100, Fax (612) 373-6285

3280 Alpine Road
Portola Valley, CA 94082-7523
(650) 529-3000, Fax (650) 529-3030

Contacts: Jeffrey P. Greiner, Bryson D. Hollimon, Michael J. Kessler, Michael P. Ogborne, Robert J. Reynolds, David R. Volk

Web site: <http://www.wessels.com>

Successful technology transactions: ACT Networks, Inc., CIENA Corporation, Concord Communications, Inc., Corsair Communications, Inc., Dassault Systems S.A., Deneb Robotics, FlexiInternational Inc., Innova Corporation, MMC Networks, Inc., Powerwave Technologies, Inc., Rogue Wave Software, Inc., Simulation Sciences, Inc., Technology Modeling Associates, Inc., USWeb Corporation, VIASOFT, Inc., Viewlogic Systems, Inc.

Description: Wessels, Arnold & Henderson, L.L.C. is an institutional investment banking firm with strong capabilities in research, corporate finance, sales and trading. Wessels' focus includes the following industry sectors: Technical Software, Networking Technology, Multimedia Software, Enterprise Software, Wireless Communications, Internet, Medical Devices and Healthcare Technology. The firm offers a full range of investment banking services including: IPOs, follow-on offerings, private placements and financial advisory/merger and acquisitions.

William Blair & Company
Limited Liability Company

**William Blair & Company,
L.L.C.**

222 West Adams Street
Chicago, IL 60606
ph (312) 236-1600, Fax (312) 368-9418

Contacts: Richard P. Kiphart, James Hickey, Ron Emerick

EWeb site: www.wmblair.com

Additional office: San Francisco, CA

Successful technology transactions:

Equity Offerings: ScanSource, Inc., Best Software, Inc., Zebra Technologies, Peapod, Deltek Systems

M&A: Cara Corp/Affiliated Computer Services, CGI Systems/Alternative Resources Corporation, Peak Technologies/Moore Corporation

Description: William Blair & Company is a full service investment bank focused on small and mid-cap high growth companies. The firm advises technology companies on all aspects of equity (private and public) and debt financings, and mergers and acquisitions. The firm provides technology companies with value-added advice by combining experienced bankers and intensive analyst research.

Commercial Banks



Bank of America
Bank of America NT & SA

High Technology Group
Jim C. Deichen, SVP
555 California Street, Dept. 5507
San Francisco, CA 94104
(415) 953-5532

Contacts: Jim C. Deichen – Technology Industry Manager, Jeff Bonzon, Jim MacGregor, Peter Tomei, Stephen Parry, Debra Staiger

Number of professionals: 28

Number of offices: Two offices; San Francisco and Palo Alto.

Bank's total assets: \$257.5 billion

Description: Through offices in San Francisco and Palo Alto, we provide a full array of financial services to technology companies nationally, from emerging growth to Fortune 500 corporations. Bank of America has proven expertise in delivering domestic and international debt financing, risk management, structured finance, and cash management solutions to technology companies on a global basis. These comprehensive capabilities have been further enhanced to include the full spectrum of equity financing, corporate advisory and technology research services offered through BancAmerica Robertson Stephens.



Bank Boston

435 Tasso Street, Suite 250
Palo Alto, CA 94301
(650) 853-0404

Contact: Information Technology-Christopher McCabe, Maia D. Heymann, Lee A. Merkle-Raymond; Asset Based Lending-William M. Tsai; Leasing-Jonathan S. Hansen; Vendor Finance-Britton H. Jefferson; Cash Management-Fay P. Blair

Bank's total assets: \$62 billion

Number of loan officers: 10

Description: BankBoston's Silicon Valley office is a full-service commercial bank and a leader in information technology lending with global capabilities. BankBoston offers a broad range of services including Cash Management, Trade Finance, Foreign Exchange, Investments, Stock Transfer, Corporate Advisory, Asset Based, Leasing and Vendor Finance. Customer base ranges from small emerging-growth companies to publicly held Fortune 500 companies.

Additional office:

Information Technology Division
100 Federal Street
Boston, MA 02110
(617) 434-2602

Contact: Kevin F. Malone

Number of loan officers: 18

Description: See Palo Alto listing above.



Comerica Bank-California

Comerica Bank-California

55 Almaden Boulevard, 2nd Floor
San Jose, CA 95113
(408) 291-6612, Fax (408) 271-4021

Contact: David J. Stearns

Email: dstearns@comerica.com

Web site: Comerica Incorporated
<http://www.comerica.com>

Number of branches: 31

Bank's total assets: \$4.2 billion

High-tech clients: Agile Software, Candescent Technologies, C-Cube Microsystems, GeoCities, Mylex Corporation, PointCast, S3 Incorporated, Silicon Valley Group

Description: A business bank that serves the needs of startup and growth-stage technology companies through superior products and customer service. Products and services include international trade finance, letters of credit, cash management, investments, financial advice and market referrals. Regional offices in California and Texas.



Silicon Valley Bank

3003 Tasman Drive
Santa Clara, CA 95054
(408) 654-7400

President and CEO: John C. Dean

Number of loan officers: 167

Number of offices: 15

Unsecured lending limit to a single company: \$30 million

Bank's total assets: \$2.6 billion

Additional offices:

Venture Capital group

3000 Sand Hill Rd., Bldg. 4, Suite 150
Menlo Park, CA 94025
(650) 233-6600

Contacts: Don Cvetusa, Doug Hamilton, Mike Weeks

Northern California Division

3003 Tasman Drive
Santa Clara, CA 95054
(408) 654-5582

Contact: Marc Verissimo

Corporate Finance Group

3003 Tasman Drive
Santa Clara, CA 95054
(408) 654-5524

Contact: Jim Forrester

Southern California Technology Division

18872 MacArthur Drive #100
Irvine, CA 92612
(714) 252-1300

Contact: Rita Pirkle

East Coast Technology Division

40 William Street, Suite 350
Wellesley, MA 02181
(617) 431-9901

Contact: David Fischer

Pacific Northwest Technology Division

11000 SW Stratus, Suite 170
Beaverton, OR 97008
(503) 526-1123

Contact: Art Hiemstra

Description: Silicon Valley Bank is a leading provider of depository services, credit and other financial services for emerging and more established middle market technology and life science companies and their executives and investors, across the United States. It also serves other specialized market niches.

(See ad on page 85)

CPA'S

ARTHUR
ANDERSEN

Arthur Andersen

Riverpark Tower
333 West San Carlos Street, Suite 1500
San Jose, CA 95110
(408) 998-2112, Fax (408) 998-2151

Contact: Mark Jensen, Worldwide High Technology Industry Director

Web site: <http://www.arthurandersen.com>

Number of offices: 381 worldwide

High-tech clients: Iomega (stock offering), Cadence Design Systems (acquisition-High Level Design Systems), Digital Generation Systems [IPO], Thermatrix [IPO], Versant Object Technology [IPO], Visigenic Software [IPO], Technology Modeling Associates [IPO], Visigenic Software (acquisition-Post Modern Computing).

Description: Arthur Andersen is a multidisciplinary professional services firm that provides a broad array of audit, accounting, tax and advisory services to technology companies of all sizes. Our professionals combine extensive technical competence and industry experience with innovative and progressive thought to assist our clients in improving business performance. Our mission is to assist rapidly-growing technology clients at all stages from startup through IPO and beyond. Our clients include companies from the software, biotech, pharmaceutical, manufacturing, venture capital, consulting, information and communications industries.

Grant Thornton

GRANT THORNTON LLP
Accountants and
Management Consultants
The U.S. Member Firm of
Grant Thornton International

Grant Thornton LLP

One California Street, Suite 1100
San Francisco, CA 94111
(415) 986-3900, Fax, (415) 986-3916

150 Almaden Boulevard, Suite 600
San Jose, CA 95113
(408) 275-9000, Fax, (408) 275-0582

Contact: John M. Latta

Number of offices: 50

Number of employees: 100

Number of CPAs: 33

High-tech clients: DSP Technology, Televideo Systems

Description: Grant Thornton, one of the largest accounting and management consulting firms in the U.S., provides a comprehensive range of accounting, tax and consulting services to manufacturing and technology companies. Our Greater Bay Area

offices, located in San Francisco and San Jose, specialize in public offerings, merger and acquisition analyses, state and local tax services, international tax planning, and compensation and benefits consulting.



KPMG Peat Marwick LLP

3460 W. Bayshore Road
Palo Alto, CA 94303

Contact: Stephen C. Riggins, Information Communications & Entertainment (ICESM), (650) 354-4038, scriggins@kpmg.com

Web site: www.ice.kpmg.com

Description: KPMG Peat Marwick provides a complete range of services to companies at all stages of development in the information, communications and entertainment industries. Services include business planning and strategy, financial management, performance improvement, information systems planning, tax planning, audit/assurance, assistance with IPOs, mergers and strategic alliances, plus a full range of international services. KPMG has 1,100 offices in 153 countries.

-Western

David A. Kane, (408) 282-4280,
dkane@kpmg.com

-Midwest

Ronald A. Safran, (312) 938-5390,
rsafran@kpmg.com

-Northeast

Eugene F. DeMark, (512) 822-9100,
ademark@kpmg.com

-Mid-Atlantic

Michael P. Joseph, (703) 917-6902,
mjoseph@kpmg.com

-Southeast

Daniel P. Mageras, (813) 825-1806,
dmageras@kpmg.com

-Southwest

Gregory B. Tomlinson, (214) 754-2231,
gtomlins@kpmg.com

(See ad on page 91)

Law Firms

Baker & McKenzie

One Prudential Plaza
130 East Randolph Drive
Chicago, IL 60601
(312) 861-8941, Fax (312) 861-2898

Contact: Michael S. Mensik

Email: michael.s.mensik@bakernet.com

Web site: <http://www.bakerinfo.com>

Public companies in technology industry:

Representative U.S. public companies in information technology include Platinum

Technology Inc., Transaction Systems Architects, and CSG Systems International, Inc.

Description: Baker & McKenzie represents technology companies from start-up to Fortune 500 in a wide variety of intellectual property, corporate and securities, tax and other practice areas in the U.S. and throughout the world. With 57 offices in 33 countries, the firm's 2000+ attorneys comprise an unequalled international network to meet our clients' needs domestically and abroad.

- San Francisco, CA (415) 576-3000

- San Diego, CA (619) 236-1441

- Palo Alto, CA (415) 856-2400

- Washington, D.C. (202) 452-7000

- Dallas, TX (214) 978-3000

- Houston, TX (281) 451-5000

- Miami, FL (305) 789-8900

- New York, NY (212) 751-5700

Bingham Dana LLP

150 Federal Street
Boston, MA 02110
(617) 951-8000, Fax: (617) 951-8736

Contact: Justin P. Morreale

Email: morreajp@bingham.com

Additional offices: New York, NY; Washington, D.C.; Los Angeles, CA; Hartford, CT; London, England

Public companies in technology industry:

Aspen Technology, Biomatix, Boston Scientific, Cubist Pharmaceuticals, Kopin, LTX, LeukoSite, Molten Metal Technology, MRS Technology, PageNet, Raytheon, UroMed, VideoServer

Description: Bingham Dana LLP specializes in representing emerging high-technology companies in many industries including information technology, biomedical and health care, from start-up through all stages of growth, public offering, or sale. Other practice areas include intellectual property and licensing, international transactions, litigation, taxation, banking and financial services, real estate, environmental, employment law and estate planning.

Buchanan Ingersoll

Attorneys

Buchanan Ingersoll

College Centre, 500 College Road East
Princeton, NJ 08540
(609) 987-6800, Fax (609) 520-0360

One Oxford Center

301 Grant Street

Pittsburgh, PA 15219

(412) 562-8800, Fax (412) 562-1041

Contact: David J. Sorin, Esq., Partner in Charge, Princeton Office, Co-Chairman, Technology and Entrepreneurial Services

Group, Carl A. Cohen, Esq., Co-Chairman, Technology and Entrepreneurial Services Group, Pittsburgh Office

Web site: <http://www.bipc.com>

Additional offices: Harrisburg, Philadelphia, Tampa, Miami, Lexington, Buffalo, Washington D.C.

Representative clients in technology industry:

AlphaNet Solutions, Bio-Imaging Technologies, Black Box, CollaGenex Pharmaceuticals, DSET Corporation, DXI, ECCS, Intelligroup, Intelenet International Corp., Lifecor, Mastech, Prophet 21, Sensar, Unidigital Inc., WiseWire

Description: Buchanan Ingersoll is one of the fastest growing law firms in the mid-Atlantic region, with 300 lawyers in 11 offices. The firm's Technology and Entrepreneurial Services Group is legal counsel to over 400 entrepreneurial and high growth technology companies and investors in technology businesses. Since the start of 1996, Buchanan Ingersoll has handled 29 registered securities offerings for clients with collective proceeds of \$2.9 billion. During the same timeframe, the firm has handled a number of major mergers and acquisitions including Galt Technologies' sale to Intuit and Ansoft's purchases of the Electronic Business Unit of the MacNeal-Schwendler Corporation and of Compact Software, Inc.



The Corporate Law Group

500 Airport Blvd., Suite 120
Burlingame, CA 94010-1914
(650) 349-8000, Fax (650) 349-8099

Contacts: Paul David Marotta, Kristen L. Roellig

Email: mail@tclg.com

Clients in technology industry: Vision Software Tools, Inc., World Internet Center, TimeLine Solutions Corporation, Personal Cellular Services Inc., Supplybase, LLC, Integrated Circuit Systems, Inc., A*Trade, NetDive, Inc., AccountMate Software Corporation, Exlibris and Resource Biometrics, Inc.

Description: We are a corporate, securities, intellectual property and international law firm, founded to provide excellent legal service to emerging-growth companies through innovative, affordable fee arrangements.

FENWICK & WEST LLP

Two Palo Alto Square
Palo Alto, CA 94306
(415) 494-0600, Fax (415) 494-1417

Contact: Gordon K. Davidson

Email: gkd@fwpa.com

Web site: <http://www.fenwick.com>

Additional offices: Washington, D.C.; San Francisco, CA

Clients in technology industry: Electronic Arts, Symantec Corp., Intuit Inc., Macromedia Inc., Premisys

Communications Inc., @Home Corporation

Description: The premier Silicon Valley-based high-technology law firm, Fenwick & West counsels companies in mergers and acquisitions, public offerings, private placements, venture capital, intellectual property protection, licensing and distribution, litigation and alternative dispute resolution, domestic and international tax planning, and employment and labor law issues.

Foley, Hoag & Eliot LLP

One Post Office Square
Boston, MA 02109
(617) 832-1000, Fax (617) 832-7000

Contacts: Robert Birnbaum, (617) 832-1106, rbiarbau@fhe.com; Peter Rosenblum, (617) 832-1151, prosenbl@fhe.com

Web site: <http://www.fhe.com>

Additional offices: Washington, D.C.

Description: We counsel high-technology companies at all stages of growth and tailor our services to particular company needs. Specialties include: assistance in obtaining public and private financing; acquisitions, licensing, distribution, and sale of technology; international trade, patent, trademark, copyright and intellectual property protection and litigation; joint ventures and corporate partnering; ERISA, tax and employment law.

GORDON & GLICKSON P.C.

Gordon & Glickson P.C.

444 North Michigan Avenue, Suite 3600
Chicago, IL 60611-3903

2555 M Street NW
Washington, DC 20037-1302

Contacts: Mark L. Gordon, Barry D. Weiss
Web site: www.ggttech.com

Public companies in Technology Industry:

Eastman Kodak Company, Ameritech Cellular Communications, Inc., Diamond Technology Partners, Inc., Sega of America, Inc.,

Description: Gordon & Glickson P.C. is a leader in providing quality legal services to the information technology market, addressing the complex issues that arise from the convergence of business and technology, built on a foundation of conventional legal disciplines -- corporate, commercial, tax, finance, intellectual property and governmental affairs. Our clients range from Fortune 500 corporations to emerging business enterprises, from not-for-profit organizations to local and state governmental agencies, and they operate world-wide in virtually every sector of this marketplace.

Graham & James LLP

600 Hansen Way
Palo Alto, CA 94304
(650) 856-6500, Fax (650) 856-3619

Contact: Joe C. Sorenson

Web site: www.gj.com

Additional offices: San Francisco: James E. Topinka; Sacramento: Gilles S. Attia; Los Angeles: Hillel T. Cohn; Seattle: John M. Steel; New York: Edward A. Bernstein

Public companies in technology industry: Active Voice Corporation, Innova Corporation, Level One Communications, Inc., RealNetworks, Inc., USCS International, Inc.

Description: Graham & James offers a full range of services, including corporate, securities and intellectual property law expertise for public offerings, private placements and other forms of high-tech corporate finance; strategic alliances and acquisitions; trademark, patent and copyright protection; and intellectual property and commercial litigation.

Hale and Dorr LLP

60 State Street
Boston, MA 02109
(617) 526-6000

Contacts: Mark G. Borden, John A. Burgess, David E. Redlick

Web site: www.haledorr.com

Additional offices: Washington, D.C.: David Sylvester, (202) 942-8454

Public companies in technology industry: Analog Devices, Inc., Thermo Electron Corp., Millennium Pharmaceuticals, Inc., Arch Communications Group, Inc., Open Market, Inc., Wang Laboratories, Inc.

Description: Hale and Dorr LLP is known as the preeminent high-technology law firm in New England. We represent companies that evolve from start-ups to mature corporations. Since 1988, we have ranked first in New England in IPOs. We have completed hundreds of deals involving mergers and acquisitions, joint ventures, strategic alliances, intellectual property and public offerings.

HELLER EHRMAN WHITE & McAULIFFE

Heller Ehrman White & McAuliffe

525 University Avenue
Palo Alto, CA 94301
(650) 324-7000

Contact: Sarah A. O'Dowd
Email: info@hewm.com

Web site: www.hewm.com

Additional offices: San Francisco, Los Angeles, Seattle, Washington, D.C., Hong Kong, Singapore

Public companies in technology industry:

ALZA Corporation, Identix Incorporated, Amati Communications Corporation, Penederm, Inc., Raychem Corporation, SEQUUS Pharmaceuticals, Sonic Solutions

Description: Heller Ehrman provides business, securities and transaction, and intellectual property services to numerous public and private companies in the life sciences, software, multimedia, telecommunications and information industries. The firm's corporate, tax, and intellectual property practice groups have extensive experience in public and private securities offerings, mergers and acquisitions, strategic partnering, licensing, tax planning and patent and trademark prosecution.

LOEB & LOEB LLP

1000 Wilshire Boulevard
Los Angeles, CA 90017-2475
(213) 688-3400, Fax (213) 688-3460

10100 Santa Monica Boulevard
Los Angeles, CA 90067-4164
(310) 282-2000, Fax (310) 282-2192

345 Park Avenue
New York, NY 10154-0037
(212) 407-4000, Fax (212) 407-4990

Contact: Phillip E. Adler, (213) 688-3646, email: padler@loeb.com; Christopher K. Aidun, (212) 407-4829, email: caidun@loeb.com; Stuart Lubitz, (310) 282-2302, email: slubitz@loeb.com

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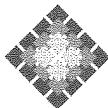
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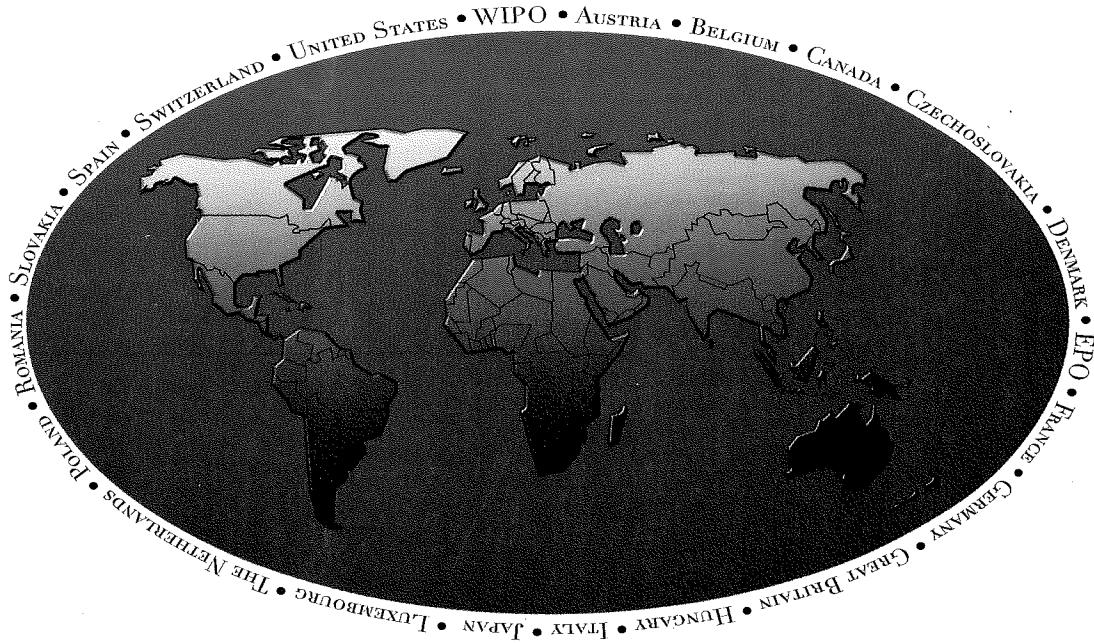
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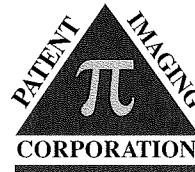
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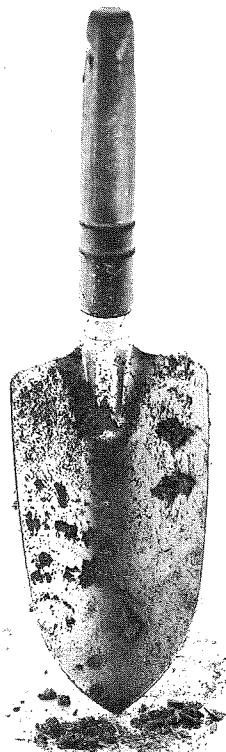


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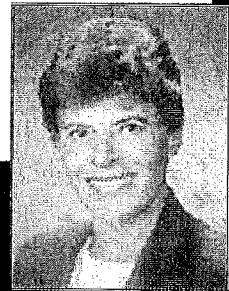
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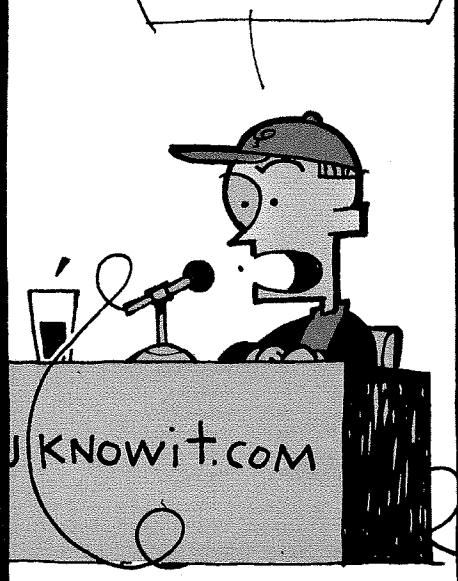
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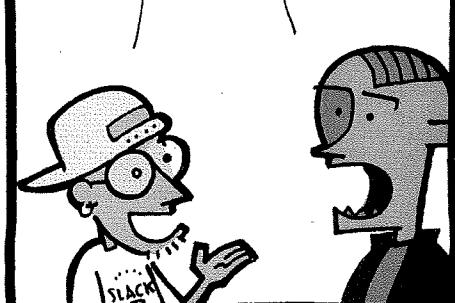
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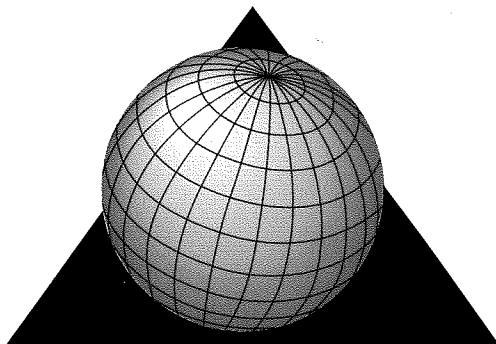


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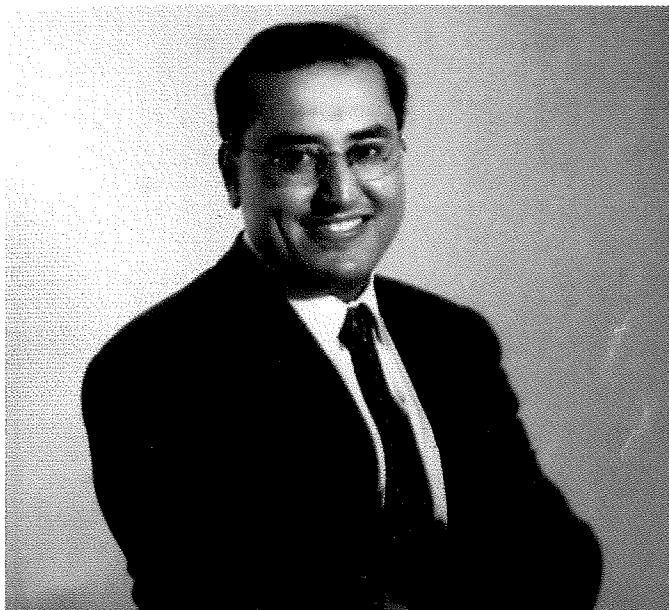




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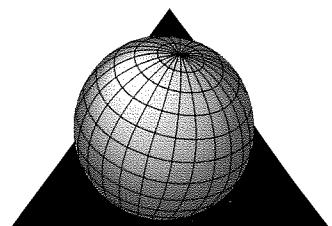


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